



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

III. KEYED RECENSIONS OF THE EUPATORIUMS OF VENEZUELA AND ECUADOR.

In the course of work primarily directed toward a revision of the Colombian Eupatoriums it was found needful to devote considerable attention to the identical or closely related species of Venezuela and Ecuador, and finally it has seemed desirable to list and key all the species of this genus known from those countries. As it appears likely that the matter thus assembled from very scattered sources will be found useful pending a monographic treatment of the whole group which cannot be completed for some years to come, it is here put on record.

EUPATORIUMS OF VENEZUELA.

Since Kunth, working upon the specimens secured by Humboldt & Bonpland, enumerated in 1820 five species of *Eupatorium* from Venezuela, there appears to have been no attempt to bring together, catalogue, key out, or otherwise to give any separate treatment for the Venezuelan members of this large genus. Although similar to Colombia in territorial extent and indeed comparable in its diversity of soil and variety of climatic conditions Venezuela is to our present knowledge much less rich in its flora, and in the case of *Eupatorium* has less than half as many species.

This difference, however, is probably more apparent than real, and it is to be remembered that of all the South American countries Venezuela has to date received the least botanical exploration. Indeed except for a few scattered and essentially coastal points which have been frequently visited, such as those around Caracas and La Guaira, Cumana and Carupano, Cumarebo and Porto Cabello, the only regions which appear to have had any serious botanical attention since the hurried journey of Humboldt and Bonpland more than a century ago have been the uplands of Mérida, visited by Moritz, Pittier, Jahn, Haman, and others, especially the region of Tovar, for some months the base of the indefatigable collector Fendler, the Paraguaná Peninsula, recently explored for its forestry resources by Curran & Haman, the islands of Margarita and Coche, diligently explored and carefully

described by J. R. Johnston, and portions of the delta region of the Orinoco Valley, traversed by Rusby & Squires in their journey of 1896.

Of the species here enumerated, nearly all rest, as to their Venezuelan occurrence, upon specimens from definitely located places within the present limits of the country. However, a few (nos. 1, 7, 21, and 30), although examined in specimens said to have come from Venezuela, have either been unaccompanied by more definite locality, or have had place-names not capable of location by any of the maps or atlases available. Of no. 16 (*E. vitalbae*) no Venezuelan material has as yet been seen or reported, but the species is known so close to Venezuela and is so frequent on both sides of the country as to make its ultimate discovery within the limits of Venezuela almost certain.

In all these cases it has seemed best to err rather on the side of fullness than of critical elimination in drawing up the present list and therefore to include all species even somewhat vaguely recorded for Venezuela.

For a key to the sections of the genus reference may be made to p. 269.

Sect. I. CYLINDROCEPHALA DC. (see p. 270).

KEY TO SPECIES.

- a. Leaves pointed (acutely or at least obtusely) at the base b.
- b. Pedicels sulcate-angulate, glabrous c.
- c. Leaves lanceolate, caudate-acuminate; involucre obtuse in bud d.
- d. Heads 45-75-flowered; leaves 3-nerved above the base
 - 1. *E. pellium*.
- d. Heads 10-20-flowered; leaves definitely pinnate-veined.....2. *E. Moritzianum*.
- c. Leaves ovate, obtusish to short-acuminate; involucre acute in bud.....3. *E. laevigatum*.
- b. Pedicels terete or nearly so, pubescent or puberulent e.
- e. Involucral scales subherbaceous at tip f.
- f. Leaves lanceolate to narrowly oblong or linear; heads about 20-flowered.....4. *E. waefolium*.
- f. Leaves rhombic-ovate; heads 45-60-flowered.....5. *E. urticoides*.
- e. Involucral scales often somewhat more deeply colored but in texture not much changed at tip g.
- g. Leaves strongly bullate above, narrowly lanceolate, attenuate to a sessile base.....6. *E. meridense*.
- g. Leaves never strongly bullate above, ovate h.
- h. Scales rounded at the tip or slightly narrowed to an obtuse point i.
- i. Leaves usually 6-10 cm. long; veins not forming

- an exerted network beneath; heads in compound corymbs *j*.
- j*. Leaves subchartaceous, subglabrous, ovate to ovate-lanceolate, attenuate, rather obscurely serrate (none in the least hastate); pedicels usually 1-1.5 cm. long, mostly curved or hooked
7. *E. subscandens*.
- j*. Leaves membranaceous, somewhat thicker, rhombic- to deltoid-ovate, rather coarsely and often somewhat hastately crenate-toothed, densely and softly villous or even tomentose beneath; pedicels usually 2-8 mm. long, mostly straight
8. *E. odoratum*.
- i*. Leaves 2-5 cm. long; veins exerted and prominently reticulated beneath; heads in a leafy panicle
9. *E. squalidum*, v. *subvelutinum*.
- h*. Scales lance-linear, acute; heads in a leafy-bracted thyrsoid panicle; leaves small (2-4 cm. long), not conspicuously reticulated beneath
10. *E. oxylepis*, v. *caracasenum*.
- a*. Leaves cordate at base
11. *E. xestolepis*.

1. *E. PELLIMUM* Klatt (see p. 272). VENEZUELA, without precise locality, *Funck & Schlim*, no. 522 (Gr.).

2. *E. MORITZIANUM* Sch. Bip. (see p. 273). MÉRIDA: in subalpine places, Mérida, *Moritz*, no. 1366 (Gr.).

3. *E. LAEVIGATUM* Lam. (see p. 273). FEDERAL DIST.: Caracas, *Birschel* (Gr., N. Y.).

4. *E. IVAEFOLIUM* L. (see p. 275). MÉRIDA: Tovar, *Fendler*, no. 1948 (Gr.).

5. *E. URTICOIDES* Sch. Bip. Nearly or quite herbaceous, 5 dm. high: stems round, branched above, sparingly beset with spreading jointed hairs; leaves opposite, rhombic-ovate, subchartaceous, coarsely serrate-dentate (the teeth sometimes again toothed), 6 cm. long, half as wide; panicles both terminal and from the upper axils, the ultimate cymes 3-7-headed; pedicels 7-18 mm. long; heads 45-60-flowered; involucre campanulate; scales 5-7-seriate, the inner long and narrow, scarious and with 1 green nerve, the apex subherbaceous, purplish and covered with orange glands, the outer scales gradually shorter, broader, and 3-striate, with subtriangular herbaceous appendages; corollas purple, 4.5 mm. long, glabrous; achenes (very immature) dark, the ribs stramineous and roughened.—Sch. Bip. ex Hieron. in Engl. Bot. Jahrb. xxviii. 568 (1901).—MÉRIDA: in warm places on the Victoriana road of Tovar, near La Viscaina, *Moritz*, no. 834, acc. to Hieron. l. c. FEDERAL DIST.: between La Guaira and Desaguados, near the city of Caracas, *Gollmer*, acc. to

Hieron. l. c. WITHOUT LOCALITY: *Lansberg*, acc. to Hieron. l. c. Not seen by the writer. The description compiled.

6. *E. MERIDENSE* Robinson. Herbaceous or somewhat shrubby perennial: stem erect, closely covered with short tawny wool of very fine matted hairs; internodes 3–6 cm. long; leaves opposite, lanceolate, attenuate-acuminate to each end, crenulate or subentire, firmish in texture, 4–6 cm. long, 1–1.5 cm. wide, bullate and puberulent above, tawny-tomentose on the 3 nerves and prominently reticulated veins beneath; corymb much rounded, compound, 1 dm. in diameter; heads numerous, pedicelled, about 10-flowered, 9 mm. high, 3.5 mm. in diameter; involucre slender-cylindric, 4–5-seriate; scales oblong, rounded or subtruncate at the ciliolate brownish summit; corollas presumably purple; achenes very slender, 3.2 mm. long or more, papillose on the ribs.—*E. scabrum* Sch. Bip. ex Hieron. in Engl. Bot. Jahrb. xxviii. 569 (1901), not L. f.—MÉRIDA: Mérida, *Moritz*, no. 1365 (Gr.).

7. *E. ODORATUM* L. (see p. 280). MÉRIDA: near Tovar, alt. 915 m., *Fendler*, no. 636 (Gr.), same locality, alt. 610 m., *Fendler*, no. 1949 (Gr.).

Var. *PAUCIFLORUM* Hieron. (see p. 281). MIRANDA: La Venta, *Wagner*, acc. to Hieron. in Engl. Bot. Jahrb. xxviii. 564 (1901). STATE NOT INDICATED: in bushy places at "Guajaca rumbo," alt. 600 m., *Wagner*, no. 277, acc. to Hieron. l. c.

8. *E. SUBSCANDENS* Hieron. (see p. 279). MÉRIDA: near Tovar, alt. 700 m., *Fendler*, nos. 1950 (Gr.) and 1950 β (Gr.).

9. *E. SQUALIDUM* DC. Shrub 1–2 m. in height, much branched above, densely pubescent; stems terete; branches ascending; leaves opposite, ovate, short-petioled, subcoriaceous, 2–5 cm. long, 1.5–3 cm. wide, 3-nerved from above the base, somewhat prominently reticulate-veiny beneath, puberulent above, slightly paler and more copiously sordid-pubescent beneath as well as closely beset with orange glands (appearing finally as a dark punctation); petiole 2–4 mm. long; inflorescence a leafy panicle; heads short-pedicelled, about 30-flowered, 8–10 mm. long, slender; involucre cylindric; scales firm, stramineous, somewhat browned toward the summit, closely imbricated in about 6 series, regularly graduated, rounded or usually somewhat narrowed to an obtuse apex, faintly 3-nerved, ciliolate; achenes slender, 3.5 mm. long, smooth or nearly so on the almost black faces, ciliolate on the light-colored ribs.—Prod. v. 142 (1836); Bak. in Mart. Fl. Bras. vi. pt. 2, 281 t. 77 (1876).

[Var. **typicum**. Stem hirsute-villous, the hairs spreading; leaves hirsute-villous beneath.—Common on plains in the interior of Brazil.]

Var. *SUBVELUTINUM* (DC.) Bak. Stem covered with a very fine incurved puberulence; leaves puberulent to sparingly tomentellous beneath.—Bak. l. c. 282.—MÉRIDA: near Tovar, *Fendler*, no. 1952 (Gr.).

Without adequate material to determine the extent to which the forms of this variable species are actually connected by intergradation, it has seemed best provisionally to accept Baker's disposition of the present plant as a variety of *E. squalidum*. It may be remarked that the leaves of the Fendler specimen are larger and more pointed than in any other material of *E. squalidum* seen by the writer, but concomitant differences of significance have not been observed.

10. *E. OXYLEPIS* DC. Shrubby, 1–2 m. high, much branched, scented; branches ascending, terete, somewhat woody, grayish-pubescent; leaves opposite, elliptic-ovate to ovate-lanceolate, subentire to crenate-serrate (often with a single tooth or sometimes with 2–4 teeth on each side), slightly roughened above, velvety-hirsute beneath, 2.8 cm. long, 1.6 cm. wide, 3-nerved from the base; petiole 2–4 mm. long; panicle much branched, very leafy; heads 14–20-flowered, 7–10 mm. high; involucre cylindrical, acute in bud; scales stramineous, firm, regularly graduated in 5–7 series, closely appressed, glabrous, slightly lucid, lanceolate to lance-linear, gradually narrowed to a really acute or (especially in the case of the outer) somewhat darkened and obtuse actual tip; corollas purple, cylindrical, glabrous.—Prod. v. 145 (1836); Bak. in Mart. Fl. Bras. vi. pt. 2, 284 (1876), excl. syn. *E. pungens* Gardn.

[Var. **typicum**. Heads about 1 cm. long; corollas 4–5 mm. long; achenes 3–4 mm. long.—Plains of Brazil, in provinces of Goyaz, Minas Geraës, São Paulo, etc.]

Var. *CARACASANUM* (Sch. Bip.) Hieron. Closely similar in habit, foliage, pubescence, etc.: heads somewhat smaller; involucre about 7 mm. long; corollas and achenes proportionally shorter.—Hieron. in Engl. Bot. Jahrb. xxviii. 567 (1901), as *caracasana*. *E. caracasenum* Sch. Bip. ex Hieron. l. c.—FEDERAL DIST.: Caracas, *Birschel* (Gr.), *Moritz*, no. 65, acc. to Hieron. l. c. MÉRIDA: on stony hills near Incantados de Petare, *Gollmer*, acc. to Hieron. l. c. MÉRIDA: near Tovar, alt. 671 m., *Fendler*, no. 1951 (Gr.), identified with the type material at the Royal Botanical Museum in Berlin by Dr. J. M. Greenman.

11. *E. XESTOLEPIS* Robinson (see p. 261). Stems round, woolly when young, almost smooth in age, dusky, pithy; branches widely spreading, curved (either upward or downward), sordidly and densely

woolly-villous; leaves opposite, ovate, sharply acuminate, cordate at the rounded base, crenate-serrate, 3–5 cm. long, 2–3 cm. wide, bullate and puberulent above, below gray-tomentose and prominently reticulated with transverse veins between the 3(–7) nerves; corymbs open and few-headed; pedicels spreading, slender, pubescent, 2–12 mm. long; heads about 9 mm. high, 6 mm. in diameter, about 28-flowered; involucre campanulate-subcylindric, the scales about 27, somewhat rigid, ivory-white, shining, 1–3-nerved, 4–5-seriate, promptly deciduous; corollas glabrous, 4 mm. long, the proper tube considerably exceeding the campanulate throat; pappus-bristles about 26, slightly clavellate and yellowish toward the top; achenes black, 4–5-angled, slightly scabrid on the angles.—MÉRIDA: near Tovar, *Fendler*, no. 638 (Gr.). FEDERAL DIST.: Caracas, *Birschel* (Gr.); on the old road from Caracas to La Guaira, alt. 1100–1700 m. *Pittier*, no. 5880 (U. S., N. Y.).

Sect. II. SUBIMBRICATA (DC.) Hoffm. (see p. 281).

KEY TO SPECIES.

- a. Perennial herbs or shrubs *b*.
- b*. Heads separate or in small (2–5-headed) glomerules, disposed in open panicles *c*.
- c*. Involucral scales 2–3(–5)-nerved or -ribbed *d*.
- d*. Leaves pinnately veined *e*.
- e*. Heads about 13-flowered; leaves attenuate at base, about 3 cm. wide; corolla with a perceptibly enlarged throat about as long as the proper tube...12. *E. tovarense*.
- e*. Heads about 21-flowered; cauline leaves mostly rounded at base, 4.5–10 cm. wide; corolla without differentiated throat.....13. *E. Squiresii*.
- d*. Leaves palmately 3(–5)-nerved *f*.
- f*. Heads about 5-flowered *g*.
- g*. Leaves crisped-puberulent to tomentose but not glandular beneath.....14. *E. iresinoides*.
- g*. Leaves copiously glandular-pubescent beneath.....15. *E. Wageri*.
- f*. Heads 20–25-flowered.....22. *E. pycnocephalum*.
- c*. Involucral scales multiseriate; heads 1.2–1.6 cm. high.....16. *E. vitalbae*.
- b*. Heads in flattish-topped fastigiately branched cymose panicles; leaves firm-coriaceous.....17. *E. amygdalinum*.
- b*. Heads crowded in corymbose or thyrsoid panicles *h*.
- h*. Leaves lanceolate to rhombic-ovate, attenuate to an essentially sessile base.....18. *E. inulaefolium*.
- h*. Leaves ovate-oblong to suborbicular, mostly rounded or obtuse at the distinctly petioled base *i*.
- i*. Shrubs (except *E. tenuifolium*); heads 4–10-flowered *j*.

- j. Leaves thickish and velvety or firm and subcoriaceous *k.*
- k. Heads in thyrsoid panicles; scales rounded or obtuse at the somewhat narrowed tip; stem glabrate 19. *E. morifolium*.
- k. Heads in a corymbosely branched flattish-topped panicle; scales acute; stem tomentose... 20. *E. Vargasianum*.
- j. Leaves thin and delicate, glabrous, rhombic-ovate 21. *E. tenuifolium*.
- i. Herbaceous perennial; heads 20–25-flowered... 22. *E. pycnocephalum*.
- a. Annual; leaves thin, ovate; heads small, in an open panicle 23. *E. microstemon*.

12. *E. TOVARENSE* Robinson (see p. 259). Branches slender, virgate, leafy, sordidly puberulent; leaves opposite, short-stalked, lance-oblong, attenuate-acuminate, cuneate at the base, feather-veined, 7–11 cm. long, 2.8–3.3 cm. wide, remotely and obscurely cuspidate-denticulate, membranaceous, green on both surfaces, glabrous above, puberulent on the veins and atomiferous beneath; petiole about 1 cm. long; panicle divaricately branched, leafy-bracted, puberulent, its branches naked toward the base; pedicels 1–3 mm. long; heads about 13-flowered, 6 mm. high, 3.5 mm. in diameter; involucre campanulate; scales about 21, stramineous-scarious, 3–4-seriate, dorsally puberulent toward the rounded tip, mostly 3-nerved and 2–4-ribbed; corollas 3 mm. long, microscopically granulate on the outside of the limb, the proper tube about equalling the slightly but distinctly enlarged throat; achenes 1.5 mm. long, black, slightly papillose on the angles; pappus-bristles about 36, white, delicately capillary.—MÉRIDA: near Tovar, alt. 1200 m., *Fendler*, no. 1947 (Gr.).

13. *E. SQUIRESII* Rusby (see p. 258). Tall perennial herb or virgate-branched shrub; stem smooth, green; leaves opposite, short-petioled, oblong, narrowed to both ends, short-acuminate at apex, usually rounded at base but sometimes slightly decurrent on the petiole, repand-dentate, feather-veined, membranaceous, green on both surfaces, glabrous throughout or sordid-puberulent on the midrib and veins beneath, 9–22 cm. long, about half as wide; panicle large, terminal, leafy-bracted to the middle, as much as 3 dm. long and 2 dm. in diameter, its branches divaricate, some bearing heads (on short secondary branchlets) almost or quite from the base; heads about 22-flowered, 6 mm. high; involucre pale straw-colored and scarious; scales in 3–4 series, graduated, dorsally somewhat pubescent toward the rounded apex; corollas yellowish-white; achenes black, 1.3 mm. long.—DELTA AMACURO: Paloma, *Rusby & Squires*, no. 2 (N. Y., Gr.).

14. *E. IRESINOIDES* HBK. (see p. 285).

Var. *a. VILLOSUM* Steetz. Leaves copiously villous to tomentose beneath; scales of the involucre acute to acuminate.—Steetz in Seem. Bot. Herald, 145 (1854).—MÉRIDA: Tovar, *Moritz*, no. 1722, *Fendler*, nos. 624 (Gr.), 1946 (Gr.). FEDERAL DIST.: Caracas and La Guaira, *Moritz*, acc. to Steetz, l. c. ARAGUA: Las Adjuntas, *Eggers*, no. 13,346 (U. S.). MARGARITA ISL.: El Valle, *Miller & Johnston*, no. 129 (Gr.); San Juan Mountain, *Johnston*, no. 95 (Gr.).

Var. *β. GLABRESCENS* Steetz. Leaves sparingly villous or nearly smooth; scales of the involucre acute or acuminate.—Steetz in Seem. Bot. Herald, 145 (1854).—FEDERAL DIST.: on mountains and in mountain gorges, in moist shady places among Agaves, La Guaira, *Otto*, no. 383 (Gr.); also *Moritz*, acc. to Steetz, l. c. CARABOBO: Puerto Cabello, *Curran & Haman*, no. 1153 (Gr.).

Var. *γ. BREVIFLORUM* Hieron. Stems whitish-tomentellous; leaves deltoid-ovate, conspicuously and cuneately decurrent upon the petioles; heads slightly smaller; involucre about 4 mm. long, the scales broader, the inner and middle obtuse, the outermost acutish.—Hieron. in Engl. Bot. Jahrb. xxviii. 573 (1901), as *breviflora*.—MÉRIDA: near Tovar, *Fendler*, nos. 623 (Gr.), 1946 (Gr.). FEDERAL DIST.: Caracas, *Birschel*. The type of this well marked variety was a plant cultivated in the Royal Garden at Berlin, about 1843 (phot. Gr.).

15. *E. WAGENERI* Hieron. Doubtfully shrubby; branches slightly sulcate-angled or subterete, velvety; internodes as much as 4.5 cm. long; leaves opposite, petiolate, broadly deltoid-ovate, shortly acuminate to an acutish or obtusish point, entire or undulate, cuneate and decurrent on the petiole, membranaceous, glandular-puberulent above, densely glandular-pubescent beneath, 3-nerved well above the base, as much as 4.5 cm. long and 3 cm. wide; panicle terminal; heads 5-flowered, cymosely glomerate, sessile or very shortly pedicelled; involucre turbinate-cylindric; scales about 12, scarious, dark-stramineous, ciliolate toward the obtusish but spinulose-mucronate tip; the inner about 4 mm. long, the outer gradually shorter; corolla (in dried state) yellowish, 2.5 mm. long, the proper tube scarcely more than 0.75 mm. long, the throat funnel-formed, 1.25 mm. long; style-branches scarcely thickened; pappus-bristles yellowish-white, connate into an annulus at the base; achenes 1.5 mm. long, the concolorous ribs roughened, the faces scabrid-pilose.—Hieron. in Engl. Bot. Jahrb. xl. 375 (1908).—VENEZUELA: without locality, *Wagener*, no. 178, acc. to Hieron. l. c. Not seen by the writer, the description compiled.

16. *E. VITALBAE* DC. (see p. 299). A species of frequent occurrence and wide distribution in the warmer parts of America, but not yet reported from Venezuela. However, as it is known to occur in Colombia, to the west, Dutch Guiana to the east, and Brazil, to the south, its ultimate discovery in this as yet very slightly explored country, seems highly probable.

17. *E. AMYGDALINUM* Lam. (see p. 301). VENEZUELA: without locality, *Moritz*, no. "6(80)" (Gr.). MÉRIDA: near Tovar, *Fendler*, no. 654 (Gr.). FEDERAL DIST.: Galipan near Caracas, *Kuntze*, no. 1525b (N. Y.).

A very sketchy subdivision of this species has been attempted by Kuntze, *Rev. Gen.* i. 337 (1891). Quite without detailed statement of differential characters, ranges, previous literature, or of critically determined exsiccatae the treatment is of little value. The subdivisions are based on characters which are confessedly subject to independent variation, their combinations being numerous and inconstant, so that they have almost no classificatory value. Finally to make the matter worse, even the rank of the proposed subcategories is in several cases left wholly obscure.

18. *E. INULAEFOLIUM* HBK., forma *TYPICUM* (see p. 292). Widely distributed from Colombia to Brazil, and with scarcely a doubt to be found in Venezuela.

Forma *SUAVEOLENS* (HBK.) Hieron. (see p. 292). MÉRIDA: near Tovar, *Fendler*, no. 641 (Gr.).

19. *E. VARGASIANUM* DC. (see p. 289). BERMUDEZ: Aragua, *Cruger* (K.). FEDERAL DIST.: Caracas, *Vargas* (DC., phot. Gr.), *Linden*, no. 137 (K.). MÉRIDA: near Tovar, *Fendler*, no. 647 (Gr.).

20. *E. MORIFOLIUM* Mill. (see p. 293). MÉRIDA: near Tovar, *Fendler*, no. 646 (Gr.).

To this species may be provisionally referred *Critonia heteroneura* Ernst, *Flora*, lvii. 210 (1874). FEDERAL DIST.: on Mt. Galipan near Caracas, *Ernst*. No material authentically representing Ernst's species has been seen, yet his description is careful and so detailed that it is possible to check up the many points in which his plant agrees fully with *E. morifolium*. It is true the florets are said to be only four, while in *E. morifolium* they are often considerably more numerous, but the number appears to be quite variable even in specimens obviously otherwise identical. The peculiar nervation, on which Ernst laid stress as a differential character and which suggested the name he chose for his plant, can be accurately matched even in specimens from Vera Cruz, the type-region of *E. morifolium*.

21. *E. MACROPHYLLOIDES* Robinson (see p. 249). Tall soft-wooded shrub 3-4 m. high; stems round, tawny-woolly; leaves opposite, triangular-ovate, acute or acuminate, subtruncate at base but shallowly cordate at the point of insertion, crenulate practically from the base, about 1 dm. long and 8 cm. wide, membranaceous, soft in texture, 3-nerved (the lateral nerves bearing on the outer side several branches almost from the base), dusty-puberulent above, grayish and softly pubescent beneath; petioles as much as 6 cm. long; inflorescence a trifid compound corymb, the parts dense, rounded, many-headed; heads short-pedicelled, about 11-flowered; involucre subcylindrical, rather loosely imbricated; scales about 4-seriate, thin, straw-colored, the inner oblong-linear, rounded at the apex, the outer gradually shorter, obtuse, ciliolate; corolla probably whitish, 4 mm. long; the slender proper tube about as long as the perceptibly and gradually enlarged throat; style-branches filiform; achenes 2 mm. long, hispid; pappus-bristles about 36, unequal.—VENEZUELA (state not indicated): at "Sanchorquig," *Eggers*, no. 13,413 (U. S.).

22. *E. TENUIFOLIUM* HBK. Herbaceous perennial; stem slightly angled, branching toward the top and leafy almost to the summit; internodes as much as 7 cm. long; leaves opposite, slender-petioled, rhombic-ovate, acute, sharply dentate except at the cuneately contracted base, 3-nerved, membranaceous, thin, 6-7 cm. long, 3-4.5 cm. wide, glabrous above, pubescent on the nerves and veins beneath; heads about 7-flowered, sessile in dense subglobose glomerules; involucre cylindrical; scales about 14, very unequal, the inner linear-oblong, obtuse or rounded at the tip, subglabrous, the outer gradually shorter, ovate, ciliate, subacute.—Nov. Gen. et Spec. iv. 107 (1820).—BERMUDEZ: between Bordones and Cumana, *Humboldt & Bonpland* (Par., phot. and trac. Gr.).

23. *E. PYCNOCEPHALUM* Less. (see p. 296). MÉRIDA: near Tovar, *Fendler*, no. 1953 (Gr.). A form somewhat more pubescent than the nearly smooth Mexican type, but without other differences of moment.

24. *E. MICROSTEMON* Cass. (see p. 295). *E. microstemon*, *a. albiflorum* Ktze. Rev. Gen. i. 338 (1891). MÉRIDA: near Tovar, *Fendler*, nos. 648 (Gr.), 1943 (Gr.). VENEZUELA, without locality, acc. to Kuntze, l. c.

Var. *LILACINUM* Ktze. Florets lilac.—Rev. Gen. i. 338 (1891).—MÉRIDA: near Tovar, *Fendler*, no. 649β (Gr.).

Sect. III. EXIMBRICATA (DC.) Hoffm. (see p. 303).

KEY TO SPECIES.

- a. Leaves 3(-5)-nerved from or slightly above the base b.
- b. Heads 10-15-flowered, panicled.....25. *E. solidaginoides*.
- b. Heads 20- ∞ -flowered, corymbd c.
- c. Villous, the hairs rather long, slender, clearly articulated; herbaceous or suffruticose d.
- d. Creeping; rhizome filiform; stems several; leaves about 1.8 cm. long and 1.3 cm. wide.....26. *E. sillense*.
- d. Not creeping; leaves 5-7 cm. long, 4-5 cm. wide e.
- e. Leaves coarsely and crenately 7-10-toothed on each side.....27. *E. articulatum*.
- e. Leaves serrately or crenately 12-18-toothed on each side.....28. *E. ibaguense*.
- c. Puberulent, the hairs very short, not articulated or very obscurely so.....28a. *E. n. sp.?*
- a. Leaves pinnate-veined, oblong or elliptical, coriaceous; shrubs, often viscid on the involucre g.
- g. Heads about 6-flowered; leaves 6-9.5 cm. long, woolly on the midrib beneath.....29. *E. Jahni*.
- g. Heads 10-15-flowered; leaves 2-3.5 cm. long h.
- h. Leaves elliptical, the exserted veinlets beneath not sulcate; pubescence of spreading attenuate bristles...30. *E. flavisetum*.
- h. Leaves oblong, the exserted veinlets beneath sulcate; pubescence scanty, of short incurved hairs.....31. *E. theaeifolium*.

25. *E. SOLIDAGINOIDES* HBK. (see p. 310). MÉRIDA: near Tovar, alt. 1067 m., Fendler, no. 629 (Gr.).

26. *E. SILLENSE* Hieron. Creeping by means of threadlike rhizomes; stems several, as much as 4 dm. high, sparingly villous, the hairs articulated; internodes sometimes as much as 5 cm. long; leaves opposite, petiolate, ovate, short-acuminate, crenate except at the rounded or cordate base, membranaceous, green and slightly glaucous on both surfaces, villous especially on the nerves, the largest 1.8 cm. long, 1.3 cm. broad; petiole scarcely over 1 cm. long; heads rather loosely cymose-corymbd at the top of the stem, 20-25-flowered; pedicels as much as 8 mm. long; involucre campanulate, the scales 12-14, linear, obtusish, nearly equal, 4.5 mm. long, thin, scarious and somewhat stramineous, villous-ciliate, 3-nerved; corollas about 3.25 mm. long, yellowish-white (in dried state); the proper tube about equalling the campanulate throat.—Hieron. in Engl. Bot. Jahrb. xl. 382 (1908).—FEDERAL DIST.: on Mt. Silla de Caracas, 20 January, 1856, Gollmer, without number. Not seen by the writer; said to resemble *E. caducisetum* DC. and *E. glechonophyllum* Less. Description compiled.

27. *E. ARTICULATUM* Sch. Bip. (see p. 316). MÉRIDA: in grassy places on the Sierra de Mérida, *Moritz*, nos. 1371 and 1410, acc. to Hieron, l. c. 385.

28. *E. IBAGUENSE* Sch. Bip. (see p. 317). MÉRIDA: near Tovar, *Fendler*, nos. 642 (Gr.), 643 (Gr.). FEDERAL DIST.: Caracas, *Moritz*, no. 252 (sk. and fragm. Gr.).

28a. *E. n. sp.?* At this point in keying the available material of the Venezuelan *Eupatoriums* is to be placed a doubtfully distinct plant represented from Tovar by Fendler's nos 649 and 650, both being in the Gray Herbarium. In nearly all technical characters close to the preceding, this plant differs in being smoother. The whole plant, in the two specimens seen, is strongly nigrescent in drying. The stem, with arched-ascending opposite branches, becomes smooth and strongly lignified toward the base. Although the plant is probably undescribed, it seems best pending further knowledge of its near relatives to leave it unnamed, especially as the material is too young to show the flowers in full anthesis.

29. *E. JAHNII* Robinson (see p. 248). Shrub; stems stout, jointed, virgate, leafy, terete, dark-purple, at first sparingly sordid-woolly, soon glabrate; internodes 2–3 cm. long; leaves oblong, acute or acutish at both ends, serrate-dentate, pinnately veined (about 10 veins on each side of the midrib), coriaceous, 6–9.5 cm. long, 2.3–4 cm. wide, above subglabrous and slightly lucid, the midrib somewhat woolly-villous, beneath sordid- or tawny-villous or woolly on the midrib and chief veins; petiole about 8 mm. long; corymb terminal, flattish or moderately convex, 7–9 cm. in diameter, crowded, many-headed, its branches and pedicels purplish-brown, pubescent; heads about 6-flowered, about 11 mm. high and 4 mm. in diameter; involucre subcylindric-campanulate, often viscid, the scales about 11, about 2-seriate, loosely imbricated but unequal, thickish except on the edges, dorsally convex, puberulent and somewhat glandular; corolla (probably purplish but in dried state pale brownish-yellow) 6 mm. long, glabrous, the proper tube much exceeded by the subcylindrical perceptibly enlarged throat; achenes 3.5 mm. long, very shortly hispidulous on the angles; pappus-bristles about 37, yellowish-white, stiffish, unequal.—MÉRIDA: Sierra de Mérida (Rio de Nuestra Señora), alt. 3000–4000 m., 16 January, 1910, *Dr. Alfredo Jahn*, no. 80 (U. S., phot. Gr.).

30. *E. FLAVISETUM* Robinson (see p. 244). Shrub with round ascending jointed branches; branchlets leafy, at first densely covered with yellowish or tawny spreading short but attenuate often curved

bristles; leaves opposite, elliptical, obtuse or rounded at both ends, crenate-serrate, coriaceous, 3–3.5 cm. long, 1.3–2 cm. wide, finely reticulated on both surfaces (the veinlets exerted but not sulcate), sparingly setulose above, more copiously setose chiefly on the midrib and larger veins beneath; petioles 1–3 mm. long; corymbs small, dense, terminal, 2–3 cm. in diameter; pedicels short, stout, shaggy with yellowish bristles; involucre campanulate, pubescent; scales about 20, of firm texture, lanceolate, loosely imbricated in about 2 series, ciliolate, often darker toward the tip; corollas glabrous, 5.5 mm. long; the proper tube 2 mm. long, the perceptibly enlarged throat campanulate-subcylindrical, 3 mm. long; anthers rounded at base, the apical appendage blunt or retuse; achenes 3.5 mm. long, hispidulous especially on the angles.—“VENEZUELA, &c.” coll. of 1842–3, *Funcke*, no. 520 (K., phot. Gr.).

31. *E. THEAEFOLIUM* Benth. (see p. 309). VENEZUELA: without locality, *Linden*, no. 464 (Gr.). TRUJILLO: Páramo de Jabón, alt. 3000–3200 m., *Jahn*, no. 29 (U. S.).

Sect. IV. PRAXELIS (Cass.) Benth. (see p. 318).

32. *E. PAUCIFLORUM* HBK. (see p. 319). *E. urticifolium* Bak. in Mart. Fl. Bras. vi. pt. 2, 343 (1876), t. 91, not *E. urticaefolium* L. f.—MÉRIDA: near Tovar, alt. 610 m., *Fendler*, no. 1955 (Gr.).

Sect. V. CONOCLINIUM (DC.) Benth. (see p. 320).

Leaves ovate, 3-nerved, green beneath..... 34. *E. ballotaeifolium*.
Leaves narrowly oblong, pinnately many-veined, white beneath.

35. *E. stoechadifolium*.

33. *E. BALLOTAEOFOLIUM* HBK. (see p. 321). *E. ballotifolium* [HBK.] Ktze. Rev. Gen. i. 337 (1891).—MÉRIDA: near Tovar, alt. 1067 m., *Fendler*, no. 653 (Gr.). FEDERAL DISTRICT: around Caracas, alt. 800–1200 m., *Pittier*, no. 5869 (N. Y.); La Guaira to Caracas, *Kuntze*, no. 1244 (N. Y.); Coticita, *Curran & Haman*, no. 1065 (Gr.); between La Guaira and Rio Grande, *Curran & Haman*, no. 1032 (Gr.); La Guaira, *Robinson & Lyon*, acc. to Johnston, Proc. Bost. Soc. Nat. Hist. xxxiv. 267 (1909). STATE NOT CLEAR: Quebrada de Anoisco, *Eggers*, no. 13,108 (U. S.). MARGARITA ISL.: El Valle, *Miller & Johnston*, no. 234 (Gr.); San Juan Mountain, alt. 500 m., *Johnston*, no. 95 (Gr.).

34. *E. STOECHADIFOLIUM* L. f. (see p. 324). MÉRIDA: Páramo de Mucuchies, *Moritz*, no. 1409 (Gr.).

Sect. VI. HEBECLINIUM (DC.) Benth. (see p. 327).

35. *E. MACROPHYLLUM* L. (see p. 329). MÉRIDA: near Tovar, alt. 915 m., Fendler, no. 644 (Gr.).

EXCLUDED SPECIES.

It has been impossible to ascertain upon just what material "*E. heptanthum* Sch. Bip." was reported by Rusby, Bull. N. Y. Bot. Gard. iv. 378 (1907) from Venezuela where "apparently collected by Seemann." From Rusby's description, however, and from Bolivian material referred by him to *E. heptanthum* it has become entirely clear that he applied the name to a plant wholly distinct from the one so named and described by Weddell, Chlor. And. i. 217 (1857).

For *E. azangaroense* Sch. Bip. the following station, which might be inferred to have been Venezuelan, is given by Weddell, Chlor. And. i. 217 (1857): "CARACAS: dans la Sierra-Nevada de Santa Marta!, h. 2600 m. (Funck, *exsicc.* no. 391)". However, from the sequence of Funck's numbers mentioned elsewhere in the same work it appears clear that the Sierra-Nevada de Santa Marta mentioned here was the well known one in Colombia.

EUPATORIUMS OF ECUADOR.

The most complete previous treatments of the Ecuadorian Eupatoriums have been those of Jameson, Syn. Pl. Aeq. ii. 79-90 (1865), and of Hieronymus in Engl. Bot. Jahrb. xxix. 5-15 (1900). In these, Jameson described 1 species of *Hebeclinium*, which he maintained as a separate genus, and 25 species of *Eupatorium*, while Hieronymus, enumerating only such plants as were contained in the extensive collections of the late Prof. A. Sodirol, listed 31 species and 2 varieties of *Eupatorium*, giving many helpful notes regarding the older species as well as diagnoses of several newly recognized members of the group. In neither of these treatments was there any attempt to key the plants.

In comparing the Eupatoriums of Ecuador with those of Colombia one is struck by the considerably altered proportions of the sections. Thus of the common and widely distributed Sect. *Cylindrocephala*, represented in Colombia by no less than 20 species and several well marked varieties, there are in Ecuador only 4 species. The two small

sections, *Praxelis* and *Campuloclinium*, represented in Colombia, are as yet unrecorded in Ecuador. Of Sect. *Conoclinium*, with 6 chiefly endemic species in Colombia, there are but 2 species in Ecuador. On the other hand, Sect. *Hebeclinium*, with but 4 species in Colombia, has no less than 6 species in the much smaller area as yet botanically explored in Ecuador. By far the greater part of the Ecuadorian Eupatoriums fall into Sect. *Subimbricata* and Sect. *Eximbricata*. These sections are about equally represented and in Ecuador as elsewhere they are quite confluent, their separation, although convenient and almost necessary for purposes of classification, being manifestly artificial.

The absence from Ecuador of certain species known to occur both in Colombia and Peru may well be due to imperfect exploration. In this connection it is to be remembered that botanical investigation of the country has as yet been restricted to limited and relatively accessible areas, but that the country as a whole presents such remarkable diversity in altitude, temperature, precipitation, exposure, and soil-conditions that when more fully explored, especially when the large and little known Prov. Oriente has been investigated, it can scarcely fail to yield an exceedingly rich flora greatly extending the representation of this as well as other large genera.

Of species pretty certain to be found in Ecuador *E. amygdalinum* Lam., *E. pauciflorum* HBK., and *E. macrophyllum* L. may be mentioned with a fair degree of confidence.

For a key to the sections of the genus, see p. 269.

Sect. I. CYLINDROCEPHALA DC. (see p. 270).

KEY TO SPECIES.

- a. Leaves ovate or lanceolate, long-acuminate or gradually narrowed to the apex b.
- b. Petiole one sixteenth to one eighth the length of the leaf-blade; heads 7-8(-10)-flowered, very slender, acute or acutish in bud.....1. *E. leptcephalum*.
- b. Petiole at least one-fifth as long as the blade; heads 10-35-flowered, obtuse or obtusish in bud.....2. *E. odoratum*.
- a. Leaves oval or elliptical, merely acutish to short-acuminate c.
- c. Heads in flattish or moderately convex corymbs; involucreal scales viscid, scarcely or not at all ciliate.....3. *E. laevigatum*.
- c. Heads subsessile in paniced glomerules; involucreal scales conspicuously ciliate, not noticeably viscid.....4. *E. Eggersii*.

1. *E. LEPTOCEPHALUM* DC. (see p. 278). To this species the writer would refer *E. tequendamense*, vars. *glanduloso-pubescens* and *glabrata* Hieron. in Engl. Bot. Jahrb. xxix. 6 (1900). Examined in fragments kindly supplied to the Gray Herbarium some years ago by the management of the Royal Botanical Garden at Berlin, these varieties are found to differ but slightly and in degree only, either from each other or from authenticated material of *E. leptocephalum*. On the other hand they may be distinguished from the typical Colombian form of *E. tequendamense* (= *E. subscandens* Hieron.) in having more slender fewer-flowered heads, straight pedicels, and leaves much more attenuate at the base. To *E. leptocephalum* the following Ecuadorian material may be referred. PICHINCHA: Quito, Jameson (Gr.); Nieblí, Sodiro, no. 6/26 (Berl., fragm. Gr.). PROVINCE NOT INDICATED: Seemann (Gr.).

2. *E. ODORATUM* L. (see p. 280). *E. floribundum* HBK. Nov. Gen. et Spec. iv. 118, t. 344 (1820); Jameson, Syn. Pl. Aeq. ii. 80 (1865). *E. conyzoides*, var. *floribundum* (HBK.) Hieron. in Engl. Bot. Jahrb. xxix. 5 (1900), as *floribunda*.—LOJA: between Loja and the Rio Catamayo, Humboldt & Bonpland, no. 3426 (Par., phot. Gr.); in mountains, acc. to Jameson, l. c. CHIMBORAZO: in the Valley of Pallatanga, alt. 1600 m., Sodiro, no. 6/27, acc. to Hieronymus, l. c.

3. *E. LAEVIGATUM* Lam. (see p. 273); Hieron. in Engl. Bot. Jahrb. xxix. 5 (1900).—PICHINCHA: in temperate region, near Nieblí, alt. 1400–2000 m., Sodiro, no. 6/25, acc. to Hieronymus, l. c.

4. *E. EGGERII* Hieron. Climbing smoothish shrub with round widely spreading branches; leaves opposite, elliptical-ovate, obtusish or shortly acuminate to an obtuse point, rounded at base, glabrous, 3–4.5 cm. long, 2.4–2.8 cm. wide, conspicuously 3-nerved, the nerves prominent beneath, depressed in furrows above; panicles leafy-bracted, the opposite spreading branches capituliferous chiefly toward their ends; heads about 10-flowered, subsessile in ovoid to subglobose glomerules; involucreal scales stramineous, about 4-seriate, ovate, ciliate, narrowed to an obtuse hairy appressed tip, mostly with a broadish median nerve closely flanked by two narrow lateral ones; corollas glabrous, the tube about 3 mm. long, scarcely enlarged into a throat about 2 mm. long; achenes glabrous, blackish, 5(–7)-costate, about 3 mm. long; pappus-bristles stiffish, yellowish-white.—Hieron. in Engl. Bot. Jahrb. xxviii. 566 (1901).—MANABÍ: near the Hacienda El Recreo, Eggers, no. 15,414 (Berl., phot. and fragm. Gr.).

Sect. II. SUBIMBRICATA (DC.) Hoffm. (see p. 281).

KEY TO SPECIES.

- a. Leaves pinnately veined; shrubs or trees b.
- b. Heads 4-12-flowered c.
- c. Leaves ovate to broadly oblong, 8-13 cm. wide, pellucid-punctate.....14. *E. morifolium*.
- c. Leaves narrowly oblong, 1-2 cm. wide, not pellucid-punctate.....5. *E. salicinum*.
- b. Heads 14-40-flowered d.
- d. Leaves lance-oblong, cordate at base.....6. *E. glutinosum*.
- d. Leaves not cordate; a group of very closely related and perhaps wholly artificial species likely to be found confluent when better known e.
- e. Erect shrubs or small trees f.
- f. Branches tetragonal; leaves cuneate at base g.
- g. Heads about 20-flowered; leaves elliptic-lanceolate, almost equally pointed at the ends, white-tomentose beneath, 3 times as long as wide..7. *E. cacalioides*.
- g. Heads about 15-flowered; leaves oblong-lanceolate, gradually acuminate to the apex, more abruptly cuneate at base, about 4 times as long as wide, yellowish-tomentose beneath.....8. *E. buddleaeifolium*.
- f. Branches hexagonal; leaves rounded at base or very shortly acuminate to the point of attachment h.
- h. Leaves white-tomentose beneath; erect shrub 9. *E. persicifolium*.
- h. Leaves delicately and somewhat obscurely pubescent beneath; tree.....10. *E. arboreum*.
- e. Climbing shrub; branches round, sulcate; leaves rounded at the base, canescent-tomentose beneath 11. *E. salviaefolium*.
- a. Leaves palmately 3(-7)-nerved from the base or from a point somewhat above the base or if pinnately veined having 2 of the lower lateral veins considerably longer and more conspicuous than the rest i.
- i. Heads 4-12- or rarely (in *E. lloense*) as many as 16-flowered j.
- j. Leaves strongly discoloured, the lower surface conspicuously whitened by a minute lanulate pubescence; heads about 11-flowered k.
- k. Leaf-blade ovate-oblong, obtuse, rounded at the base 12. *E. organoides*.
- k. Leaf-blade deltoid-ovate, acutish, cordate at the base 13. *E. niveum*.
- j. Leaves (when mature) never whitened beneath l.
- l. Heads thyrsoïd; leaves very large (12-20 cm. long, 8-13 cm. wide).....14. *E. morifolium*.
- l. Heads corymboid or loosely paniced; leaves considerably smaller m.
- m. Inflorescence an open panicle n.
- n. Heads 12-16-flowered; leaves ovate-lanceolate, glabrous beneath.....15. *E. lloense*.

- n. Heads about 5-flowered, disposed singly or by few-headed glomerules in a loose forking cymose panicle; leaves sparingly pubescent to velvety beneath.....16. *E. iresinoides*.
- m. Inflorescence compact; heads crowded o.
 - o. Leaves obtusish or barely acute p.
 - p. Heads sessile or nearly so; leaves crenate almost from the base; shrub.....17. *E. chamaedrifolium*.
 - p. Heads slender-pedicelled; leaves crenate from about the middle or subentire; tree.....18. *E. prunifolium*.
 - o. Leaves acuminate or attenuate q.
 - q. Leaves ovate, slender-petioled r.
 - r. Leaves thin, delicately membranaceous; involucreal scales ciliate but slightly if at all dorsally pubescent; corollas about 3.5 mm. long.....19. *E. pseudoglomeratum*.
 - r. Leaves thickish or somewhat firm s.
 - s. Scales dorsally pubescent as well as ciliate; corollas (probably white) 3.5 mm. long 20. *E. pseudoriganoides*.
 - s. Scales ciliate but essentially glabrous dorsally; corollas (lilac-blue) 5.5-6 mm. long. 21. *E. Stuebelii*.
 - q. Leaves rhombic-ovate or lanceolate, subsessile or on short thickish petioles.....22. *E. inulaefolium*.
 - i. Heads 18-70-flowered t.
 - t. Heads densely corymbd u.
 - u. Leaves deltoid-ovate, 2-3 cm. long, coarsely crenate; petioles 2-4 mm. long.....23. *E. rugosum*.
 - u. Leaves 6-9 cm. long; petioles 5-10 mm. long v.
 - v. Leaves ovate or ovate-lanceolate, more than half as long as broad, punctate but essentially glabrous beneath.....24. *E. obscurifolium*.
 - v. Leaves ovate-lanceolate, about a third as long as broad, pubescent and glandular-atomiferous beneath.....25. *E. chimborazense*.
 - t. Heads loosely paniced w.
 - w. Climbing shrub; leaves coriaceous; heads 10-12 mm. high.....26. *E. vitalbae*.
 - w. Annual herb; leaves thin, membranaceous; heads about 4 mm. high.....27. *E. microstemmon*.

5. *E. SALICINUM* Lam. (see p. 286); HBK. Nov. Gen. et Spec. iv. 131 (1820); Jameson, Syn. Pl. Aeq. ii. 81 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 11 (1900).—PICHINCHA: at the base of Mt. Pichincha, alt. 3050 m., Jameson, no. 154 (K.). CHIMBORAZO: at the foot of the Volcano Tunguragua, near the village of Penipe, alt. 2470 m., Humboldt & Bonpland (Par., phot. Gr.). PROV. NOT INDICATED: in shade among thickets on high plains, Sodiro, no. 6/28, acc. to Hieron. l. c.

Although no material of *E. Jamesonii* Turcz. Bull. Soc. Nat. Mosc. xxiv. pt. 1, 169 (1851) has been seen by the writer, it is impossible from its character and habitat to doubt its identity with *E. salicinum* Lam., with which it appears to agree fully in all important features.

6. *E. GLUTINOSUM* Lam. Shrub or small tree 2-3 m. high; branches terete, striate-angulate, purple, glandular-pubescent, vernicose and very sticky; leaves opposite, petiolate, lanceolate, gradually narrowed from near the cordate base to the attenuate tip, 7-12 cm. long, 2-3 cm. wide, thickish, glabrous and lucid but deeply bullate and rugulose above, white-velvety beneath; petiole 1-1.8 cm. long; corymbs terminal, scarcely exceeding the leaves, many-headed but not very crowded; pedicels mostly 1-1.5 cm. long, purple, glandular-puberulent, viscid, flexuous; heads 1 cm. high and equally thick, about 30-flowered; involucre campanulate, 5 mm. high; scales about 22, moderately unequal but rather loosely imbricated (transitional between § *Subimbricata* and § *Eximbricata*), the outer ovate, the intermediate lanceolate, acute or acuminate, dorsally convex, glandular-puberulent, the innermost linear; corollas purple, smooth, 5.5 mm. long, very slightly and gradually enlarged from near the base to the summit but without clearly marked throat; achenes glabrous; pappus-bristles about 37, yellowish-white, slightly stiffish, finely hispidulous.—Encyc. ii. 408 (1786); HBK. Nov. Gen. et Spec. iv. 131 (1820); Benth. Pl. Hartw. 198 (1845); Jameson, Syn. Pl. Aeq. ii. 84 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 10 (1900), xxviii. 571 (1901).—PICHINCHA: 1833, *F. Hall* (sk. and fragm. Gr.); Andes of Quito, *Jameson* (Gr.). PICHINCHA OR LEON: between Mulaló and El Tambillo, alt. 2745 m., *Humboldt & Bonpland*. CHIMBORAZO: in the upper region of thickets near Pangor and Huangopod, near Cajabamba, alt. 2900-3400 m., *Lehmann*, no. 5191 (N. Y.); in scattered thickets on the western slopes of Chimborazo and Mt. Tiupullo, alt. 3000-3300 m., *Lehmann*, no. 7960, acc. to Hieron. l. c. PROV. NOT INDICATED: in the Achupoyas Mountains, *Hartweg*, no. 1094 (sk. and fragm. Gr.). VERNACULAR NAMES: *matico*, *chusalonga*.

7. *E. CACALIOIDES* HBK. A shrub with tetragonal dark-purple viscid or vernicose branches; leaves opposite, petiolate, oblong-lanceolate, acuminate at apex, almost equally pointed at base, 7-8 cm. long, 2-2.6 cm. wide, subcoriaceous, glabrous, finely reticulated and dark-green above, canescent-tomentose beneath; petiole 1.5 cm. long, smoothish, channelled above; corymbs terminal, dense, not exceeding the leaves; branchlets and pedicels pubescent; heads sessile and pedicelled, about 8 mm. high, about 20-flowered; corollas tubular, glabrous, blue (Townsend); achenes dark, 3 mm. long, hispidulous-roughened on the ribs.—Nov. Gen. et Spec. iv. 130 (1820); Jameson, Syn. Pl. Aeq. ii. 86 (1865).—PICHINCHA? "in Regno Quitensi?" *Humboldt & Bonpland* (Par., phot. Gr.). CHIMBORAZO:

Cordillera de Riobamba, acc. to Jameson, l. c. LOJA: between Utuana and Colaisaca, alt. 2540–2640 m., *C. H. T. Townsend*, no. 995 (U. S.). Pressed leaves have the odor of licorice (Townsend).

8. *E. BUDDLEAEFOLIUM* Benth. Shrub; branches purplish-brown, smooth, shining, vernicose; internodes about 5 cm. long, somewhat compressed-tetragonal, with concave slightly costulate surfaces; leaves opposite, petiolate, lance-oblong, serrulate-denticulate from the cuneate base to the gradually acuminate apex (teeth very numerous, 0.4–0.8 mm. high, 1.5–2.3 mm. broad), green, glabrous, and lucid above, strongly 1-costate and pinnately many-veined (veins 30–40 on each side, leaving the midrib at an angle of 65°–87°), reticulated beneath, the surface gray-tomentose, the veins nearly smooth, slightly coriaceous, 1–1.5 dm. long, 2–3.2 cm. wide; petiole 1–1.8 cm. long; corymb terminal, trichotomous, surpassed by the leaves, glabrous but viscid; heads 14–15-flowered, sessile or nearly so, 11 mm. long, 5 mm. in diameter; involucre subcylindric-campanulate, about 5-seriate; scales about 25, stramineous, long-ciliate, otherwise subglabrous, viscid, the outer ovate to ovate-lanceolate, often purple-tipped, the innermost linear, readily deciduous; corollas presumably purple, 4.8 mm. long, glabrous, the tube gradually enlarged from near the base to the limb but without distinctly marked throat; achenes about 3 mm. long, sparingly hispid on the angles; pappus-bristles very numerous (about 70) and finely capillary, yellowish-white.—*Pl. Hartw.* 135 (1844); Jameson, *Syn. Pl. Aeq.* ii. 81 (1865). Incorrectly reduced to *E. arboreum* by Hieron. in *Engl. Bot. Jahrb.* xxix. 10 (1900). — LOJA: in mountains, *Hartweg*, no. 757 (K., sk. Gr.). PROV. NOT INDICATED: Quitensian Andes, 1855, *Couthouy* (Gr.). [Peru, Prov. of Chachapoyas, *Mathews*.] Compared by Bentham to *E. salicinum* Lam., but not closely related. *E. salicinum* has tomentose branches and subsessile nearly entire leaves of different texture and venation, the lateral veins being only 6–8 on each side and leaving the midrib at an angle of only about 45°.

9. *E. PERSICIFOLIUM* HBK. Erect shrub; branches hexagonal, subglabrous, arcuate or flexuous; internodes 4–8 cm. long; leaves opposite, petiolate, oblong-lanceolate, attenuate-acuminate at the apex, at base rounded in general contour but slightly cuneate at the point of insertion on the petiole, denticulate or crenulate, subcoriaceous, glabrous and rugulose above, white-tomentose beneath, about 9 cm. long and 2.5–3 cm. wide; petiole about 1.5 cm. long; corymb terminal, exceeded by the leaves, rounded, trichotomous; heads about 25-flowered, mostly pedicelled though crowded in the partial inflores-

cences; involucre about 4-seriate, narrowly campanulate; scales about 30, ovate-lanceolate to linear, acute, viscid; corollas about 5.5 mm. long, glabrous; achenes 5 mm. long, sparingly glandular between the scabrous ribs (f. Hieron.).—Nov. Gen. et Spec. iv. 130 (1820); Hieron. in Engl. Bot. xxix. 10 (1900). *E. persicaefolium* [HBK.] DC. Prod. v. 162 (1836); Jameson, Syn. Pl. Aeq. ii. 86 (1865).—LEON: base of Cotopaxi, near Mulaló, alt. 2928 m., *Humboldt & Bonpland* (Par., phot. Gr.). TUNGURAGUA: near Mocha, *Sodi*ro, no. 6/23a, acc. to Hieron. l. c.

10. *E. ARBOREUM* HBK. A small tree in technical characters exceedingly close to the preceding; branches also hexagonal and smooth, those of the inflorescence sordid-pubescent; leaves much as in the preceding but in the type-material really rounded at base, densely sordid-pubescent beneath; corymbs rounded, about equalling or slightly exceeding the leaves; heads about 25-flowered; involucre somewhat turbinate-campanulate; scales fuscous-stramineous, ciliate and dorsally somewhat puberulent or pulverulent, inclining to viscosity, acute, the outer ovate-lanceolate, the inner linear.—Nov. Gen. et Spec. iv. 131 (1820); Jameson, Syn. Pl. Aeq. ii. 87 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 10 (1900), excl. syn. *E. buddleae-folium*.—CHIMBORAZO: between Pomallacta and Alausí, alt. 2562 m., *Humboldt & Bonpland*, no. 3240 (Par., phot., sk., and fragm. Gr.); on slopes of Chimborazo, *Sodi*ro, no. 6/16, acc. to Hieron. l. c.—TUNGURAGUA: near Ambato, *Sodi*ro, no. 6/23b, acc. to Hieron. l. c. The Peruvian *E. discolor* DC. Prod. v. 161 (1836), reduced by Hieronymus, l. c., to this species, is shown by the original in the Prodrömus Herbarium at Geneva to have leaves cuneate at base, much less toothed (indeed only obsoletely crenulate), and much more densely and copiously white-tomentose beneath.

11. *E. SALVIAEFOLIUM* HBK. A climbing shrub with terete shallowly furrowed sticky branches; leaves opposite, deflexed, oblong-lanceolate, gradually acuminate, rounded at base, deeply crenulate-denticulate (some of the teeth triangular and rather sharp, others ovate-oblong and rounded at the tip), coriaceous, glabrous and green but bullate-rugose above, white-tomentose beneath, 7–8 cm. long, 1–2.5 cm. wide; petiole about 1 cm. long; corymb terminal, rounded; heads glomerulate; involucre and florets as in the two preceding species.—Nov. Gen. et Spec. iv. 131 (1820); Jameson, Syn. Pl. Aeq. ii. 88 (1865).—CHIMBORAZO: in cool places on slopes of Chimborazo, alt. 3294 m., *Humboldt & Bonpland*, no. 3144 (Par., phot. Gr.).

12. *E. ORIGANOIDES* HBK. (see p. 284); Benth. Pl. Hartw. 198

(1845); Jameson, Syn. Pl. Aeq. 85 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 9 (1900).—PICHINCHA: Andes of Quito, 1855, *Couthouy* (Gr.); 1859, *Jameson* (Gr., N. Y.); near Guapulo, *Hartweg*, acc. to Benth. l. c.—PROV. NOT INDICATED: in subandean thickets, alt. 2000–3400 m., *Sodirol*, no. 6/24, acc. to Hieron. l. c. [Colombia.]

13. *E. NIVEUM* HBK. (see p. 285); Benth. Pl. Hartw. 198 (1845); Jameson, Syn. Pl. Aeq. 83 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 7 (1900).—PICHINCHA: alt. 3050 m., *Couthouy* (Gr.); Rumibamba, *Hartweg*, no. 1096; Andes of Quito, *Jameson* (Gr., N. Y.). PROV. NOT INDICATED: in subandean thickets, alt. 2000–3400 m., *Sodirol*, no. 6/24, acc. to Hieron. l. c.

14. *E. MORIFOLIUM* Mill. (see p. 293). *E. populifolium* HBK. Nov. Gen. et Spec. iv. 111 (1820); Hieron. in Engl. Bot. Jahrb. xxix. 7 (1900).—PICHINCHA: near San Nicolas, alt. 800–900 m., *Sodirol*, no. 6/29, acc. to Hieron. l. c.

15. *E. LLOENSE* Hieron. Herbaceous perennial, perhaps slightly woody toward the base; stems slender, flexuous, terete, dark-colored, puberulent; leaves opposite, petiolate, rhombic-ovate or -lanceolate, crenate-serrate except at the acuminate or attenuate apex and more abruptly cuneate entire base, 3-nerved, membranaceous, sparingly pubescent above when young, at maturity essentially glabrous, dark-green above, dull and somewhat paler beneath, 3–5 cm. long, 1.4–2 cm. wide; petiole 1–2 cm. long; panicle terminal, opposite-branched, subcorymbose, loose; pedicels filiform, 4–9 mm. long, often curved, finely pubescent and somewhat glandular; heads about 12–16-flowered, often nodding; involucre campanulate; scales about 12, thin, subscarious, very unequal, the outer short, ovate-oblong, acute, dorsally puberulent, the inner oblong-linear, mostly with 3 fine green nerves and 2 pale ribs, almost smooth; corollas white or nearly so, 3–3.5 mm. long, glabrous; proper tube about 1 mm. long, gradually passing into a scarcely enlarged cylindrical throat; achenes about 1.6 mm. long, grayish-brown, glabrous, callose at base; pappus-bristles delicately capillary, white.—Hieron. in Engl. Bot. Jahrb. xxix. 11 (1900).—PICHINCHA: Andes of Quito, 1855, *Couthouy* (Gr.); Valley of Lloa, alt. 2745 m., *Jameson*, no. 373 (K.); in bushy places, valley of Lloa, at the base of Mt. Pichincha, *Sodirol*, no. 9/2 (Berl., fragm. Gr.).

16. *E. IRESINOIDES* HBK. (see p. 285). *E. iresinoides*, var. *villosum* Steetz, in Seem. Bot. Herald, 145 (1854); Hieron. in Engl. Bot. Jahrb. xxix. 12 (1900).—GUAYAS: at borders of woods, near Guayaquil, *Sodirol*, no. 6/21, acc. to Hieron. l. c.

17. *E. CHAMAEDRIFOLIUM* HBK. Upright shrub; stems virgate or trichotomously forked; the branches curved-ascending, terete, velvety-pubescent; leaves opposite, subsessile or shortly petioled, ovate or oval, obtuse or rounded at the tip, rounded at base, crenulate, thickish, subcoriaceous, 3-nerved, sparingly pubescent above, softly sordid- or dark-pubescent beneath, about 2 cm. long and 1.5 cm. wide; petiole 2–3 mm. long; corymbs terminal, compact, 3–6 cm. in diameter; heads 10–12-flowered; involucre campanulate-cylindrical; scales closely appressed, oval to oblong-linear, green, somewhat striate, ciliate, often purplish at the obtuse tip; corollas violet, glabrous; achenes almost black, roughened on the angles, 2 mm. long.—Nov. Gen. et Spec. iv. 113 (1820); Jameson, Syn. Pl. Aeq. ii. 81 (1865).—LOJA: in the mountains, acc. to Jameson, l. c. [Peru.]

18. *E. PRUNIFOLIUM* HBK. Small tree, about 4 m. high; branches terete, shallowly ribbed or furrowed, pubescent; leaves opposite, ovate-oblong, scarcely acute at the tip, rounded at base, quite entire or shallowly crenate above the middle, coriaceous, 3-ribbed from somewhat above the base, 3–3.6 cm. long, half as wide, dark-green, smooth, and glabrous above, paler, pubescent, and prominently reticulated beneath; petiole 6–8 mm. long; corymbs chiefly terminal (occasionally becoming lateral), rounded, about 6 cm. in diameter, dense; pedicels 4–6 mm. long, pubescent; heads about 12-flowered, 1 cm. high; involucre campanulate-subcylindrical, loosely imbricated, 5–6 mm. high; scales about 12, oblong to linear, glabrous, purplish at tip, the outer acute, glutinous; corollas white, with differentiated tube and throat, smooth; achenes about 3 mm. long, black; pappus-bristles dusky, roughened.—Nov. Gen. et Spec. iv. 132, t. 349 (1820); Jameson, Syn. Pl. Aeq. ii. 83 (1865).—PICHINCHA: in the gorge of Tarqui near Quito, alt. 2470 m., *Humboldt & Bonpland*, no. 3287 (Par., phot. and sk. Gr.). Referred here, as by DeCandolle, to § *Subimbricata* but in involucre character transitional between this group and § *Eximbricata*.

19. *E. PSEUDOGLOMERATUM* Hieron. (see p. 291).—PICHINCHA: Andes of Quito, 1855, *Couthouy* (Gr.); environs of Quito, *Jameson*, no. 893 (K.). PROV. NOT INDICATED: in moist bushy places, alt. 2000 m., *Sodirol*, nos. 6/2 (Berl., fragm. Gr.), 6/4 (Berl., phot. Gr.), and 6/10 (Berl.). [Colombia.]

20. *E. PSEUDORIGANOIDES* Hieron. Shrub; branches spreading, terete, finely striate, at first pubescent, later glabrate; leaves opposite, ovate, long-acuminate, rounded at base, crenate to subentire, thickish, subcoriaceous, above glabrous, lucid, bullate and rugose, beneath

dull and covered with a soft olivaceous pubescence, 3(-5)-ribbed, 2.5-4 cm. long, half as wide; petiole 4-12 mm. long; inflorescence a much branched compound terminal hemispherical corymb or a leafy-bracted dense pyramidal panicle; heads 10-12-flowered, 7 mm. high, shortly slender-pedicelled or some sessile in the forks of the cymose branching; involucre campanulate, about 3-seriate; scales pale, scarious-stramineous, thin, ciliate, dorsally pubescent or at least pulverulent-puberulent, the outer broadly ovate, rounded at the tip, the inner oblong, obtuse; corollas 3 mm. long, apparently white, the proper tube about equalling the scarcely differentiated but slightly expanded throat, glabrous; achenes 1.8 mm. long, glabrous.—Hieron. in Engl. Bot. Jahrb. xxix. 10 (1900).—PICHINCHA: Andes of Quito, *Jameson*, no. 68 (K.). AZUAY: Surucucho, near Cuenca, *Jameson* (K.). PROV. NOT INDICATED: sterile places in the interandean region, *Sodi*ro, no. 6/24b (Berl., phot. and fragm. Gr.); without locality, *Jameson* (U. S.).

21. *E. STUEBELII* Hieron. (see p. 288).—CHIMBORAZO: Campamento Utiñag, valley of the Rio Chambo, alt. 3045 m., *Stübel*, no. 272 (Berl., phot. and fragm. Gr.). [Colombia.]

22. *E. INULAEFOLIUM* HBK., f. *SUAVEOLENS* (HBK.) Hieron. (see p. 291).—CHIMBORAZO: Pallatanga Valley, alt. 2000 m., *Sodi*ro, no. 6/12, acc. to Hieron. l. c.

23. *E. RUGOSUM* HBK. Shrub; branches trichotomous, round, softly pubescent, curved-ascending; leaves opposite, short-petioled, triangular-ovate, obtuse at apex, subtruncate, rounded, obtuse, or barely acute at base, crenate, scabrid and bullate-rugose above, canescently hispid-tomentose beneath, 3-3.6 cm. long, 2.4-2.8 cm. wide; petiole 4-5 mm. long; corymbs dense, terminal, 4.5-7.5 cm. in diameter; heads 18-20-flowered, 1.4 cm. high; involucre narrowly campanulate; scales about 30, the inner narrowly oblong, pale-green, substramineous, ciliate, obtuse, the intermediate and outer much broader, firmer in texture, dark-violet toward the broadly rounded tip, narrowed below, mostly 5-ribbed, the ribs united at base; corollas pale-purple, smooth, except for some granulation on the outside of the limb, 5-nerved, about 5 mm. long; achenes hispid near the summit; pappus-bristles yellowish-white, hispid-roughened, unequal.—Nov. Gen. et Spec. iv. 114 (1820); *Jameson*, Syn. Pl. Aeq. ii. 87 (1865).—CHIMBORAZO: on dry open hills between Alausí and Cerro de Sitzan, alt. 2288 m., *Humboldt & Bonpland*, no. 3227 (Par., phot., sk., and fragm. Gr.).

24. *E. OBSCURIFOLIUM* Hieron. Erect or somewhat decumbent

herb, reaching 2 m. in height; stem terete, sordid-puberulent; hairs short, spreading, flexuous, attenuate; internodes 4-6(-8) cm. long; leaves opposite, petiolate, narrowly ovate, gradually narrowed to an acutish or acuminate apex, rounded at the base, bluntly serrate-dentate, membranaceous, 3-nerved from the base, puberulent on the nerves, fuscous-brown or dark-olivaceous in drying, dull, 4-6 cm. long, about half as wide; petiole 8-11 mm. long; corymbs trichotomous, leafy-bracted at base; heads 30-70-flowered (Hieronymus), 9 mm. high, pedicellate; involucre scales about 25, somewhat graduated, about 3-seriate, lance-linear, mostly 2-ribbed, the ribs united at base into a conspicuous elongated callosity; corollas reddish-lilac (Lehmann), 4.5 mm. long, slender, slightly and gradually enlarged upward, hispidulous near the limb; achenes smooth, shining, dark-brown, 2 mm. long.— Hieron. in Engl. Bot. Jahrb. xxix. 9 (1900).— AZUAY: in dense thickets, near Chagál and Yervas-buenas, on the slopes of the western Andes, near Cuenca, alt. 2000-2700 m., *Lehmann*, nos. 4884 (Berl., fragm. Gr.) and 7984 (Berl., phot. Gr.). CHIMBORAZO: in the subandean region, *Sodi*ro, no. 6/7b, acc. to Hieron. l. c. [Colombia, acc. to Heering.]

25. *E. CHIMBORAZENSE* Hieron. Presumed to be suffruticose and climbing; the round stems glandular-pubescent; internodes 4-5 cm. long; leaves opposite, slender-petioled, ovate-lanceolate, caudate-attenuate, rounded at base, serrulate, firm-membranaceous or sub-chartaceous, above puberulent, in age rugose and bullate, below sordid- or olivaceous-pubescent and copiously covered with sessile glands, subtriplinerved then pinnate-veined and prominently reticulated, 7-9 cm. long, 2.4-3 cm. wide; petiole 1.3-2 cm. long; corymb dense, terminal, about 6 cm. in diameter; heads subsessile or on short thick and densely pubescent pedicels, 25-40-flowered, about 9 mm. long; involucre campanulate; scales graduated, about 4-seriate, narrowed to an acute tip, the outer ovate, dorsally crisped-puberulent, the intermediate and inner gradually longer, narrower, and smoother, mostly 3-nerved; corollas (in dried material showing 5 dark nerves) 5 mm. long, glabrous, slenderly tubular, slightly and gradually enlarged upward; achenes 2.5 mm. long, glabrous; pappus-bristles yellowish-white, minutely scabrid.— Hieron. in Engl. Bot. Jahrb. xxix. 7 (1900).— CHIMBORAZO: on slopes of Mt. Chimborazo, *Sodi*ro, no. 6/15 (Berl., phot. and fragm. Gr.).

26. *E. VITALBAE* DC. (see p. 299); Hieron. in Engl. Bot. Jahrb. xxix. 11 (1900). *E. ecuadorae* Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 356 (1894).— GUAYAS: in dense woods near Naranjal,

Lehmann, no. 5686 (N. Y.); near Balao, *Eggers*, no. 14,086 (N. Y.).
 PICHINCHA: in subtropical region, alt. 2000 m., near Nieblí, *Sodiro*,
 no. 6/22, acc. to Hieron. l. c. PROV. NOT INDICATED: without locality,
Jameson (sk. and fragm. Gr.).

27. *E. MICROSTEMON* Cass (see p. 295). *E. guadalupense* DC. Prod.
 v. 170 (1836) and probably of Hieron. in Engl. Bot. Jahrb. xxix. 12
 (1900), excl. syn. "*E. Sinclairii*" [*Sinclairi*], although described as
 "herba prostrata."—CHIMBORAZO: San José, on western slopes of
 Mt. Chimborazo, *André*, no. 6 of his second series (Gr.); ? in woods
 of subtropical valleys, Pallatanga, *Sodiro*, no. 6/29, acc. to Hieron.
 l. c. (as *E. guadalupense*).

Sect. III. EXIMBRICATA (DC.) Hoffm. (see p. 303).

KEY TO SPECIES.

- a. Leaves coriaceous b.
- b. Leaves (the mature cauline) cordate c.
- c. Delicate flexuous herb; leaves 3-nerved from the base,
 2-2.5 cm. long.....41. *E. cuencanum*.
- c. Viscid shrub; leaves feather-veined, 7-12 cm. long...6. *E. glutinosum*.
- b. Leaves not cordate d.
- d. Heads 3-12-flowered e.
- e. Leaves pubescent beneath.....18. *E. prunifolium*.
- e. Leaves glabrous on both surfaces f.
- f. Heads 3-7-flowered; very closely related species
 likely to prove more or less confluent when known
 from more copious material g.
- g. Leaves more or less nerved, either 3-nerved from
 the base or with 2 pairs of nerves one nearly basal
 the other starting somewhat above the base h.
- h. Leaves 5-13 cm. long, 2.4-4.5 cm. wide...28. *E. pseudochilca*.
- h. Leaves 3-4 cm. long, 1.8-2.6 cm. wide i.
- i. Leaves obsoletely serrulate above the middle;
 teeth 4-7 on each side.....29. *E. umbrosum*.
- i. Leaves serrate-dentate at least above the
 middle; teeth 9-19 on each side...30. *E. cotacachense*.
- g. Leaves truly feather-veined, the lower veins not
 enlarged or more conspicuous than the others j.
- j. Leaves 3-9 cm. long; reticulation relatively
 coarse (ultimate areolae about 1 mm. in diame-
 ter); petiole 8-10 mm. long.....31. *E. exserto-venosum*.
- j. Leaves 9-12 cm. long; reticulation very fine
 (ultimate areolae about 0.5 mm. in diameter);
 petiole about 2 cm. long.....32. *E. dendroides*.
- f. Heads about 12-flowered.....33. *E. fastigiatum*.
- f. Heads 20- ∞ -flowered k.
- k. Leaves elliptical, rounded at base; petiole about
 5 mm. long.....34. *E. elegans*.

- k. Leaves ovate, acute at base; petiole 1.4–1.8 cm. long. 35. *E. viscosum*.
- a. Leaves membranaceous l.
- l. Leaves sessile; pedicels copiously glandular. 36. *E. glanduliferum*.
- l. Leaves petioled (shortly so in *E. gracile*, v. *epilobioides*, which, however, does not have glandular pedicels) m.
- m. Heads subracemously disposed in a pyramidal panicle. 37. *E. solidaginoides*.
- m. Heads corymbose or in flattish cymes n.
- n. Leaves ovate-suborbicular o.
- o. Spreading-villous; teeth of leaves about 14 on each side; heads 40–45-flowered. 38. *E. pichinchense*.
- o. Puberulent; teeth of leaves 6–9 on each side; heads 25–30-flowered. 39. *E. Sodiroi*.
- n. Leaves deltoid-ovate to ovate-lanceolate p.
- p. Petiole short, one-tenth to one-fifth as long as the blade; inflorescence sparingly pubescent, the hairs slender, attenuate, articulated, curved-ascending or subappressed. 40. *E. gracile*, v. *epilobioides*.
- p. Petiole relatively longer, one-fourth to two-thirds as long as the blade; inflorescences puberulent with stipitate glands q.
- q. Heads 16–19-flowered; stems glabrous to the inflorescence. 41. *E. cuencanum*.
- q. Heads 25–40-flowered; stem puberulent much below the inflorescence r.
- r. Heads about 7 mm. high. 42. *E. glechonophyllum*.
- r. Heads slightly larger, about 9 mm. high; leaves lanceolate to deltoid-ovate. 43. *E. azangaroense*.

28. *E. PSEUDOCILCA* Benth. Shrub, smooth but viscid, 9–15 dm. high; branches round, very leafy; internodes mostly 1.5–2 cm. long; leaves opposite, ovate-oblong, petiolate, 6–7 cm. long, 3–4 cm. wide, scarcely acute, rather finely serrate except at the entire and rounded base, firm in texture, glabrous and reticulated on both surfaces, lucid above, dull beneath; petiole about 1 cm. long; corymb dense, rounded, 8 cm. in diameter, many-headed, slightly puberulent, or beset with sessile glands; heads 5–6-flowered, about 7 mm. long; involucral scales few, subequal, 3–4 mm. long, oblong, obtuse, dark-purple toward the tip, beset with sessile glands; corollas 5.5 mm. long; proper tube 1.5 mm. long, beset with a few sessile glands; throat about 4 mm. long, glabrous; achenes (immature) 1.5 mm. long, hispidulous toward the summit especially on the angles; pappus-bristles about 30, unequal, yellowish-white, slightly stiffish, somewhat roughened, the longest about 4 mm. in length.—Pl. Hartw. 198 (1845); Jameson, Syn. Pl. Aeq. ii. 85 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 7 (1900), excl. syn. *E. prunifolium* Klatt, which is a much smaller-leaved plant apparently not distinguishable from *E. cotacachense* Hieron.—PICHINCHA: Rumibamba (thus on original label but incor-

rectly cited as Riobamba by Benth. l. c.), village of Guapulo, Hacienda de Pinantura, *Hartweg*, no. 1095 (K., N. Y., phot. G.); Andes of Quito, alt. 3050 m., *Jameson* (Gr.).

29. *E. UMBROSUM* Benth. Sticky shrub with flexuous slightly hexagonal branches; leaves opposite, short-petioled, elliptical, 2.5–4 cm. long, 15–20 mm. wide, acutish, mucronate, rather abruptly cuneate at base, obsoletely serrulate above the middle, the teeth very few (4–7 on each side), 3-nerved from the base, rather firm, glabrous on both surfaces; petiole 2–5 mm. long; inflorescence considerably exceeding the leaves, pedunculate, fastigiately branched, dense, many-headed, strongly convex, about 8 cm. in diameter; heads 6–7-flowered; involucre narrowly campanulate, its scales 8–10, lance-oblong, acutish, viscid, about 2-seriate, subequal.—Pl. Hartw. 198 (1845); *Jameson*, Syn. Pl. Aeq. ii. 84 (1865).—PICHINCHA: in shade, Rumibamba, near Quito, *Hartweg* (unnumbered unicate, K., phot. Gr.).

30. *E. COTACACHENSE* Hieron. Shrub, 2–3 m. high, smooth except for a sparing and somewhat obscure puberulence on the young often vernicose and sticky parts; branches erect or curved-ascending, irregularly quadrangular, leafy; internodes 1–4 cm. long; foliage yellowish-green when fresh, often fuscous after drying; leaves lanceolate-oblong to elliptical, acute or obtusish, serrate or crenate except at the entire more or less cuneate base, 3–4 cm. long, 2–2.6 cm. wide, firm in texture, 3-nerved from above the base, a pair of smaller intramarginal nerves between the main nerves and the actual base, both surfaces finely reticulated, the veinlets prominent, teeth 9–19 on each side; petiole about 5 mm. long, canaliculate above; corymbs dense, many-headed, 4–6 cm. in diameter, strongly convex, fastigiate, about equalling or sometimes exceeding the leaves; heads 3–5-flowered, about 7 mm. high; involucre narrowly campanulate, the scales 5–7, subequal, lance-oblong, obtusish to rounded at the apex, 3(–5) mm. long, viscid, usually 2-ribbed; corolla white, 5 mm. long; the proper tube 1.5 mm. long, beset with sessile glands, the throat glabrous, 3.5 mm. long; achenes (immature) 1.5 mm. long, granulated.—*Hieron.* in Engl. Bot. Jahrb. xxi. 331 (1895). *E. prunifolium* Klatt in Engl. Bot. Jahrb. viii. 35 (1887), not HBK.—IMBABURA: Cerro Cotacachi, *Stübel*, no. 59 (Berl., phot. and fragm. Gr.). CARCHI: Páramo de Tuza [Tusa], alt. 3400 m., *Lehmann*, no. 587 (Gr.); in the Andes of Ecuador without precise locality, *Spruce*, no. 5805 (Gr.). Locally called *chilca blanca* (André).

31. *E. EXSERTO-VENOSUM* Klatt. Glabrous shrub 9–12 dm. high,

slightly viscid-verniceous on the younger parts and inflorescence; branches ascending or erect, at first somewhat quadrangular, leafy; leaves opposite, petiolate, elliptical, obtuse, rounded at the base, crenulate, coriaceous, green and lucid above, slightly paler and somewhat lucid beneath, 2.5–5(–8) cm. long, about half as wide, pinnately veined from base to apex, the veins diverging at a wide angle from the midrib, veinlets reticulated and prominent on both surfaces; corymb strongly convex, 5–7 cm. in diameter, many-headed, fastigiately branched, dense; heads 6–7-flowered, about 7–8 mm. high; involucre narrowly campanulate; scales 8–10, oblong, obtuse, thickish, obscurely ribbed, essentially glabrous but viscid; corollas about 5 mm. long; proper tube slender, 1–1.5 mm. long, granulated; throat subcylindric, 3.5–4 mm. long, glabrous; achenes (immature) viscidulous; pappus-bristles yellowish-white, stiffish, unequal, the longest about 4 mm. in length.—Abh. Naturw. Ges. Halle, xv. 324 (1882), in advance reprint p. 4 (1881). *E. exerto-venosum* [Klatt] Hook. f. & Jacks. Ind. Kew. i. 917 (1893), by misprint. *E. pseudofastigiatum*, var. *crenata* Hieron. in Engl. Bot. Jahrb. xxxvi. 468 (1905).—[Peru: without locality or number, Mathews (fragm. Gr.); Cutero, von Jelski, no. 789 (Berl., fragm. Gr.).] This form with elliptical crenately toothed leaves, typical of Klatt's species and of Hieronymus's var. *crenata*, does not thus far appear to have been found in Ecuador. Hieronymus is probably right in classing it and two or three other leaf-forms as varieties of the same species, but seems to have overlooked the prior description of the Mathews plant by Klatt, which necessarily becomes the type of the species, to which the Ecuadorian plant may be appended as a variety, thus:

Var. **pseudofastigiatum** (Hieron.), comb. nov. Leaves ovate-lanceolate, acute or acutish at the apex, rather sharply serrate-dentate from somewhat below the middle, entire and decidedly cuneate at the base; leaf-texture and venation, as well as inflorescence and floral characters, as in the typical variety.—*E. fastigiatum* ? Benth. Pl. Hartw. 135 (1844), not HBK. *E. loxense* Hieron. in Engl. Bot. Jahrb. xxi. 331 (1895), not Klatt. *E. pseudofastigiatum* Hieron. l. c. xxxvi. 467 (1905).—LOJA: in mountains, Hartweg, no. 758 (K., Berol., phot. and fragm. Gr.); ECUADOR: without number or more precise locality, Seemann (Gr.).

32. *E. DENDROIDES* (HBK.) Spreng. Tree with glabrous at first somewhat angled soon subterete dark-purple branches; leaves opposite, petiolate, ovate-oblong, narrowed or somewhat acuminate to a mostly obtusish and slightly cuspidate tip, crenate or cuspidate-

serrulate except at the entire cuneate base, 10–12 cm. long, 4–5 cm. wide, pinnate-veined, finely and prominently reticulate-veined on both surfaces (ultimate areolae about 0.5 mm. in diameter), glabrous and somewhat lucid; midrib sulcate on the upper surface toward the base; petiole 2 cm. long; corymbs compound, as much as 2 dm. in diameter, moderately convex, obscurely puberulent; heads very numerous, shortly pedicelled, usually by 2's or 3's, 5-flowered, 7 mm. long, 4 mm. in diameter; involucre campanulate, 4–5 mm. long; scales about 7, lance-oblong, obtuse, unequal, dorsally granular and viscid, the inner ciliolate at the broadish summit; corollas violet, granulate on the short proper tube, the throat scarcely enlarged, nearly or quite smooth; achenes 2 mm. long, roughened on the angles; pappus-bristles about 21, unequal, hispidulous.—Syst. iii. 415 (1826); Hieron. in Engl. Bot. Jahrb. xxii. 776 (1897), not Bak. *Mikania arborea* HBK. Nov. Gen. et Spec. iv. 139 (1820), not *E. arboreum* HBK. l. c. 131.—LOJA: near Loja, alt. 2013 m., *Humboldt & Bonpland*, no. 3367 (Par., phot. Gr.). [Peru.]

33. *E. FASTIGIATUM* HBK. (see p. 307).—LOJA: in mountains, acc. to Jameson, Syn. Pl. Aeq. ii. 86 (1865). [Colombia.]

34. *E. ELEGANS* HBK. Shrub with round virgate pilose-tomentose leafy branches; leaves opposite, subsessile or very shortly petioled, elliptic-ovate, obtuse, crenate-serrulate except at the rounded entire base, feather-veined and reticulated, coriaceous, slightly scabrous on both surfaces, somewhat pubescent on the midnerve and veins beneath, about 3 cm. long, half as wide; corymbs terminal, small, 3–5 cm. in diameter, congested, subsessile, scarcely exceeding the surrounding leaves; heads subsessile; involucre campanulate, the scales 10–15, lanceolate, obtuse; corollas inferred to be white; pappus-bristles whitish, equalling the corolla, hispidulous.—Nov. Gen. et Spec. iv. 133 (1820); Jameson, Syn. Pl. Aeq. ii. 89 (1865).—AZUAY?: in ravine of Tarqui ? *Humboldt & Bonpland* (Par., phot. Gr.). Even in the original description of this species its type-locality is stated with doubt. The plant does not appear to have been rediscovered.

35. *E. VISCOSUM* HBK. Glabrous viscid shrub; branches hexagonal, leafy; internodes 3–5 cm. long leaves opposite, petiolate, ovate-oblong, narrowed to a scarcely acute apex, crenate-serrate except at the obtusish entire base, conduplicate, coriaceous, 8 cm. long, 3–3.5 cm. wide, smooth and sticky, reticulate-veiny, dark-green and shining above, pale and dull beneath; petiole 1 cm. long; corymb composite, open, irregularly and somewhat fastigiately branched; bracts linear, entire; heads pedicelled, about 40-flowered, 8 mm. high;

involucre campanulate; scales about 17, lanceolate, acute, subequal, dusky-purple, loosely imbricated, a few of the outermost shorter; corollas inferred to be violet, smooth, enlarged in the throat; achenes hispid on the angles; pappus-bristles dusky, hispid.—Nov. Gen. et Spec. iv. 129 (1820); Jameson, l. c. 88.—Inferred (by Kunth) to have been collected in ECUADOR ("crescit in Regno Quitensi?"), *Humboldt & Bonpland* (Par., phot. Gr.).

This species, known to the writer only from the type-material at Paris, is suspiciously close to the Colombian plant subsequently described by Benth. Pl. Hartw. 200 (1845), as *E. latipes*, which, however, has smaller leaves (3–7 cm. long) and broad petioles only 3–5 mm. in length. It is probable that the latter species will have to be reduced, and it seems not improbable that the original material of *E. viscosum* came not from Ecuador but from the mountains around Bogotá, the source of many of Humboldt & Bonpland's specimens.

36. *E. GLANDULIFERUM* Hieron. Branching undershrub 1–1.5 m. high; stems terete, often purplish-brown, densely clothed with widely spreading very unequal articulated and for the most part gland-tipped hairs; leaves opposite, sessile, ovate, acuminate, rounded at the slightly clasping base, serrate, 5–6 cm. long, about half as wide, membranaceous, green and slightly glandular-puberulent above, paler and especially on the nerves copiously pubescent beneath; 3-nerved from the base; corymbs terminal, trichotomous, many-headed, rather loose; pedicels filiform, densely glandular-pubescent, 8–18 mm. long; heads about 40-flowered, 8–9 mm. high; involucre campanulate, the scales about 14, subequal, linear, acute, mostly 2-costulate; corollas white, glabrous, 4 mm. long; proper tube slender, 1.5 mm. long; throat cylindrical, 2.5 mm. long; achenes 2.5 mm. long, brownish-black, upwardly hispidulous on the angles, slightly contracted just below a pale pappus-bearing cuplike annulus or disk at the summit.—Hieron. in Engl. Bot. Jahrb. xxix. 13 (1900).—CHIMBORAZO: at the edge of woods on Mt. Chimborazo, *Sodiño*, no. 6/7a (Berl., fragm. Gr.).

37. *E. SOLIDAGINOIDES* HBK. (see p. 310); Jameson, Syn. Pl. Aeq. ii. 83 (1865). *E. filicaule* Sch. Bip. in Gray, Proc. Am. Acad. xxi. 384 (1886); Robinson, Proc. Am. Acad. xxxviii. 213 (1902). *Ophryosporus solidaginoides* (HBK.) Hieron. in Engl. Bot. Jahrb. xxix. 4 (1900).—CHIMBORAZO: between Ticsan and Alausí, *Humboldt & Bonpland* (Par., phot. and trac. Gr.). GALÁPAGOS IDS.: Iguana Cove, Albemarle Id., *Snodgrass & Heller*, no. 29 (Gr.).

Var. **typicum**. Leaves at maturity glabrous or nearly so above,

puncticulate and sparingly pilose beneath. (Lit., synonym., and exsicc. as above.)

Var. *BONPLANDIANUM* (Sch. Bip.) Robinson. Leaves finely pubescent above, velvety-tomentose beneath.—Proc. Am. Acad. xlii. 27 (1906). *E. syringaeifolium* Turcz. Bull. Soc. Nat. Mosc. xxiv. pt. 1, 169 (1851). *Ophryosporus solidaginoides*, var. *Bonplandianus* (Sch. Bip.) Hieron. in Engl. Bot. Jahrb. xxix. 4 (1900), as *Bonplandiana*. —IMBABURA: ravines near Ibarra, Jameson, no. 676 (Gr.); in bushy places near Ibarra, alt. 1200 m., Sodiro, no. 6/19 (Berl., fragm. Gr.).

38. *E. PICHINCHENSE* HBK. (see p. 317); Hieron. in Engl. Bot. Jahrb. xxix. 13 (1910).—PICHINCHA: slopes of Mt. Pichincha, Humboldt & Bonpland, no. 3116 (Par., phot., Gr.); Quitensian Andes, Couthouy (Gr.); in woods on the Volcano Paschocha, alt. 2900 m., Sodiro, no. 6/6a, acc. to Hieron, l. c. [Colombia.]

39. *E. SODIROI* Hieron. Weak branched undershrub 1–2 m. high; branches curved-ascending, terete, puberulent (hairs minute, jointed, purplish); leaves opposite, petiolate, suborbicular-ovate, obtuse, 3–5 cm. long and wide, few-toothed except at the entire and commonly oblique or strongly asymmetrical base, subglabrous on both surfaces; petiole 9–14 mm. long; corymbs terminal and lateral from the upper axils, together forming a large leafy-bracted flattish-topped inflorescence; heads somewhat glomerate, pedicelled, 25–30-flowered; involucre campanulate; scales about 18, lance-linear, thin, green, loosely villous on the back, subequal, about 2-seriate; corollas white, 4 mm. long, shortly villous toward the limb; the proper tube slender, about equalling the much larger cylindrical throat; achenes upwardly hispid on the angles.—Hieron. in Engl. Bot. Jahrb. xxix. 12 (1900).—PROV. NOT INDICATED: in subandean thickets, Sodiro, no. 6/6b (Berl., fragm. Gr.).

40. *E. GRACILE*, var. *EPILOBIOIDES* (HBK.) Robinson (see p. 313). *E. caducisetum* DC. Prod. v. 165 (1836); Benth. Pl. Hartw. 201 (1845). *E. caducisetum* Jameson, Syn. Pl. Aeq. ii. 90 (1865).—PICHINCHA: between Quito and the village of Guapulo, acc. to Benth. l. c., as *E. caducisetum*; environs of Quito, acc. to Jameson, l. c., as *E. caducisetum*. [Colombia.]

The Ecuadorian plant mentioned by Benthham is said to have slightly smaller leaves than the original Colombian one. The author has had no opportunity to examine or verify the identity of the Ecuadorian material of this plant. Belonging as it does to a highly technical group it should have further study before its presence in the flora of Ecuador can be regarded as established.

41. *E. CUENCANUM* Robinson (see p. 241). Slender decumbent

perennial herb, glabrous up to the inflorescence, this beset with short dark stipitate tack-like capitate glands; stem terete, flexuous, very smooth, purplish-brown; leaves opposite, petiolate, ovate, cordate at base, narrowed to an obtusish tip, firmly membranaceous, 2–2.5 cm. long, 1.2–1.6 cm. wide, 3(–5)-nerved from the base; petiole slender, 8–12 mm. long; inflorescence a loose terminal trichotomous few-headed cyme; heads 16–19-flowered, about 7 mm. high, 3–4 mm. in diameter; involucre campanulate, the scales about 18, acute or a little erose, mostly 2-costulate and 3-nerved, 5 mm. long, beset with a few stipitate glands; corollas apparently white, 3.5 mm. long, the proper tube 1.7 mm. long, the throat cylindrical, moderately enlarged, the limb sparingly short-villous; achenes 3 mm. long, pale brown, glabrous: crowned by a disk, pappus-bristles about 14, caducous.—AZUAY, Cuenca, *Sallé* (K., phot. Gr.).

42. *E. GLECHONOPHYLLUM* Less. Perennial herb or slender under-shrub; stem terete, flexuous, usually purplish, at first puberulent, at length glabrate; hairs all very short, some spreading and gland-tipped, others incurved and attenuate; branches opposite, curved-ascending; leaves deltoid-ovate, slender-petioled, more or less caudate-acuminate at the apex, rounded, subtruncate, or open-cordate at the base, thin-membranaceous, serrate to more often rather coarsely crenate, varying greatly in size (1–7 cm. long, 0.8–5 cm. wide), nearly glabrous; petiole 0.4–3 cm. long, pubescent; corymbs terminal, leafy-bracted at base, mostly rather loose; heads about 30-flowered, slender-pedicelled; involucral scales narrowly lanceolate, obtuse to acuminate, subequal, the outer dorsally pubescent; corollas white, with roseate tinge, glabrous except near the slightly hispid limb; proper tube slender, about equalling the distinctly enlarged cylindrical throat; achenes about 2 mm. long, black or nearly so, hispidulous.—*Linnaea*, vi. 105 (1831); *Gay*, *Fl. Chil.* iii. 474 (1847); *Reiche*, *Fl. Chil.* iii. 265 (1902), which see for synonym.—*PICHINCHA*: Andes of Quito, *Jameson* (Gr.), *Couthouy* (Gr.). [*Chili*, Peru.] *E. Sternbergianum* DC. to which some of the Ecuadorian material has at times been referred is a doubtfully separable Peruvian species.

43. *E. AZANGAROENSE* Sch. Bip. (see p. 315); *Hieron.* in *Engl. Bot. Jahrb.* xxix. 13 (1900).—*PROV. NOT INDICATED*: in subandean thickets, *Sodiro*, no. 6/3, Weddell's narrower-leaved forma *a*, acc. to *Hieron.* l. c.; in andean pastures, *Sodiro*, no. 6/5 (Berl., fragm. Gr.), the broader-leaved forma *β*, acc. to *Hieron.* l. c.

This species is scarcely distinguishable from the preceding but the writer hesitates to reduce it to synonymy without study of authentic material not at present accessible.

Sect. IV. CONOCLINIUM (DC.) Benth. (see p. 320).

KEY TO SPECIES.

- Leaves deltoid-ovate, cordate, scabrid above; corymbs terminal
 44. *E. lamiifolium*.
 Leaves ovate-lanceolate, truncate at base, glabrous above;
 corymbs axillary.....45. *E. Turczaninowii*.

44. *E. LAMIIFOLIUM* HBK. Doubtfully herbaceous (Kunth), suffruticose (Jameson), or shrubby and climbing (Sodirol); stems round, striate, densely pubescent, the hairs delicate, attenuate, and articulated; leaves opposite, petiolate, triangular-ovate, shallowly cordate, crenate-dentate, thickish-membranaceous, 3(-5)-nerved from the base, rugose, bullate, and scabrid above, coarsely reticulated and gray-velvety beneath, 6-7 cm. long, 4-5 cm. wide; petiole 2 cm. long; corymb terminal, dense, rounded, 5 cm. in diameter; heads about 36-flowered (26-50 acc. to Hieron. l. c.), 9 mm. long, 5 mm. in diameter; involucre narrowly campanulate, about 4-seriate; scales about 40, acute, lanceolate, pubescent, green or the inner purple-tinged; florets blue (Jameson); achenes about 2 mm. long, nearly or quite glabrous.—Nov. Gen. et Spec. iv. 113 (1820); Jameson, Syn. Pl. Aeq. ii. 88 (1865); Hieron. in Engl. Bot. Jahrb. xxix. 7 (1900).—PROV. NOT INDICATED: "In regno Quitensi," *Humboldt & Bonpland* (Par., phot. Gr.). PICHINCHA: Andes of Quito, alt. 2745 m., *Jameson*, no. 617 (Gr.); in low subandean woods near Quito and Nono, *Sodirol*, nos. 6/8 and 6/13, acc. to Hieron. l. c.

45. *E. Turczaninowii*, nom. nov. Stem suffruticose, round, smooth; branches sticky-pubescent; leaves rather long-petioled, opposite, ovate-lanceolate, acuminate, truncate at base, revolute on the margin, crenate, much wrinkled and glabrous above, white-tomentose beneath; corymbs axillary, nodding; heads many-flowered; involucre 3-seriate, the scales colored, slightly viscid, ovate-oblong, the outer obtuse, the inner longer and acuminate; receptacle conical; corollas smooth, violet; style-branches linear-clavate, thick; style-base bulbous.—*Conoclinium rugosum* Turcz. Bull. Soc. Nat. Mosc. xxiv. pt. 1, 168 (1851), not *Eupatorium rugosum* HBK. (1820).—PICHINCHA: Quito, *Jameson*, no. 209. A species not seen by the writer but from character (here compiled) seemingly of this affinity and distinct.

Sect. V. *HEBECLINIUM* (DC.) Benth. (see p. 327).

KEY TO SPECIES.

- a. Petioles not winged; florets 20–60 b.
- b. Stem conspicuously quadrangular.....46. *E. guapulense*.
- b. Stem terete or merely ribbed c.
- c. Scales of the involucre about 20, subequal, somewhat
 ligulate-appendaged; leaves shortly cuneate at the base
- 47. *E. ovatifolium*.
- c. Scales 30–50, graduated; leaves not cuneate at the base d.
- d. Leaves 3-nerved from a point 5–10 mm. above the
 rounded base; involucre scales lacerate-ciliate toward
 the tip and bearing a thin membranaceous obtuse ap-
 pendage; heads 20–25-flowered.....48. *E. recreense*.
- d. Leaves 3-nerved essentially from the cordate base;
 scales ovate to oval, very obtuse, not appendaged;
 heads 25–40-flowered.....49. *E. obtusisquamosum*.
- a. Petioles winged; florets 100–300.....50. *E. nemorosum*.

46. *E. GUAPULENSE* Klatt. Shrubby, climbing, 2–3 m. high, finely and closely rusty-puberulent; branches flexuous, rather sharply quadrangular, the angles rib-like, the faces (at least one pair of them) concave; internodes about 1 dm. long; leaves opposite, long-petioled, broadly ovate, soft, membranaceous, finely serrate almost from the shallowly cordate base to the acuminate tip, 3-nerved from the base, pubescent above, rusty-tomentose beneath; heads 20–30-flowered in paniculately disposed glomerules rather than in a corymb; corollas light-blue; scales of the involucre 3–4-seriate, obtuse, striate; achenes slightly roughened.—Leopoldina, xx. 90 (1884); Hieron. in Engl. Bot. Jahrb. xxix. 14 (1900). *Hebeclinium tetragonum* Benth. Pl. Hartw. 198 (1845); Jameson, Syn. Pl. Aeq. ii. 79 (1865).—PICHINCHA: rather rare, between the village and bridge of Guapulo near Quito, Hartweg, no. 1097 (K., phot. Gr.); in moist subandean thickets, Sodiño, no. 6/26b, acc. to Hieron. l. c.

47. *E. OVATIFOLIUM* Hieron. Herbaceous perennial 5 dm. high or more; stem simple and glabrate below, above pubescent, dark-violet, terete; leaves opposite, petiolate, ovate, crenate-dentate except at the acutish or obtusish apex and the shortly cuneate or acuminate base, membranaceous, sparingly villous above, glabrous beneath, 3-nerved, 6 cm. long, 3.5–4 cm. wide; petiole 0.5–3 cm. long, not winged; heads 60–65-flowered, in crowded terminal cymes; pedicels pubescent, sometimes 2 cm. long; involucre broadly campanulate; scales about 20, subequal, linear-lanceolate, shortly acuminate, somewhat ligulate-appendaged and often purplish at the tip; corollas 5 mm. long, the

proper tube about 2 mm. in length, the funnel-formed throat slightly longer; achenes blackish, hispidulous on the angles.—Hieron. in Engl. Bot. Jahrb. xl. 387 (1908).—PICHINCHA: in thickets at the base of Mt. Pichincha, alt. 300 m., *Sodiro*, no. 3, acc. to Hieron. l. c. (whence above char. is here compiled).

48. *E. RECREENSE* Hieron. Herbaceous and probably perennial, 2–2.5 m. high; leaves opposite, petiolate, round-ovate, very closely and obscurely crenate except at the acuminate and mucronate apex and rounded base, membranaceous, puberulent on the nerves above and over the entire lower surface, the largest 15 cm. long, 13.5 cm. wide; petioles as much as 5 cm. long; heads 20–25-flowered, in dense terminal cyme-like corymbs; pedicels 2–10 mm. long; involucre narrowly campanulate, 4–5-seriate; scales 30–40, the upper part lacerate-ciliate on the hyaline margin but otherwise smooth, the apex provided with a thin obtuse appendage; corollas 3.5 mm. long; achenes glabrous, dark-colored.—Hieron. in Engl. Bot. Jahrb. xl. 389 (1908).—MANABÍ: near Hacienda El Recreo, *von Eggers*, no. 15,148, acc. to Hieronymus, l. c., from whose original description the above character is condensed.

49. *E. OBTUSISQUAMOSUM* Hieron. Shrub with habit of *E. macrophyllum* and *E. guapulense*; stems subterete or somewhat angulate or flattened, covered with closely matted tawny tomentum; internodes about 1 dm. long; leaves opposite, slender-petioled, round-ovate, broadly cordate, obtusish or slightly acuminate, obscurely crenulate, membranaceous, puberulent and green above, canescent-tomentose beneath, 10–13 cm. long, as broad or slightly broader, 3-nerved somewhat above the base; petioles 2–5 cm. long; heads in a compact terminal corymb, 28–33-flowered; involucre campanulate, about 4-seriate, essentially glabrous, the outer scales broadly ovate, 3–7-costate, brownish-green, narrowly scarious-margined, rounded at the tip, the innermost linear and readily deciduous; receptacle hemispherical, shortly pilose; corollas slenderly tubular, 5 mm. long, the throat slightly and gradually enlarged, glabrous, the limb very short and hispidulous; achenes 1.6 mm. long, dark-brown with pale ribs.—Hieron. in Engl. Bot. Jahrb. xxix. 14 (1900).—PROV. NOT INDICATED: in moist subandean thickets, *Sodiro*, no. 6/20a (Berl., phot. and fragm. Gr.)

50. *E. NEMOROSUM* Klatt (see p. 327). From this species it has been impossible to separate the Bolivian *E. Rusbyi* Britton, Bull. Torr. Bot. Club, xviii. 334 (1891). Furthermore, although the writer has had no opportunity to examine material of *E. pteropodium* Hieron.

in Engl. Bot. Jahrb. xxix. 15 (1900), its characters, very fully described by its author, coincide in all significant features with those of *E. nemorosum*. The differences are almost entirely in the greater size, of the leaves and the more numerous florets. Neither of these matters seems likely to be of specific value. Klatt's sketch of his type, a rather careful drawing now in the Gray Herbarium, shows the lower leaves more than 25 cm. in length (including the winged petiole, which is 7 cm. long and 1 cm. wide). The blade is about 8 cm. in breadth. It will be seen on comparison that the differences between these dimensions and those given for the lower leaves of *E. pteropodium* by Hieronymus are in no way greater than are usual in individuals of the same species. As to the number of florets, it is true that Klatt, apparently without actual count, roughly estimated it at 100 in his *E. nemorosum*; but a head from Colombian material, collected by Rusby & Pennell and closely matching the type-fragments in Klatt's herbarium, had by careful count no less than 221 florets. The difference between 221-flowered in the case of *E. nemorosum* and 250–300-flowered as stated by Hieronymus for his *E. pteropodium* has no great significance, since variations of much greater latitude have often been observed in individuals of the same species or even in heads of the same individual. It seems strange that Hieronymus, in describing *E. pteropodium* makes no comparison of it with *E. nemorosum* so closely resembling it in all described respects but states that his new plant was not nearly related to any previously described species. The fact, however, that he elsewhere in the same paper lists *E. nemorosum* Klatt and states that it should be placed in Sect. *Hebeclinium* next "*E. macrocephalum* L." — a clerical slip, by which he certainly meant *E. macrophyllum* L., a species with which, however, it has no close affinity, strongly suggests that in some manner Hieronymus has been misled as to the real identity of *E. nemorosum*, and that having referred to it some quite different plant similar to *E. macrophyllum* he therefore failed to notice the identity of his *E. pterophyllum* with the true *E. nemorosum*.— PROV. (CHIMBORAZO?) NOT INDICATED: in tropical and sub-tropical region near El Puente de Chimbo, Sodiro, no. 6/30, acc. to Hieron. l. c., as *E. pteropodium*.